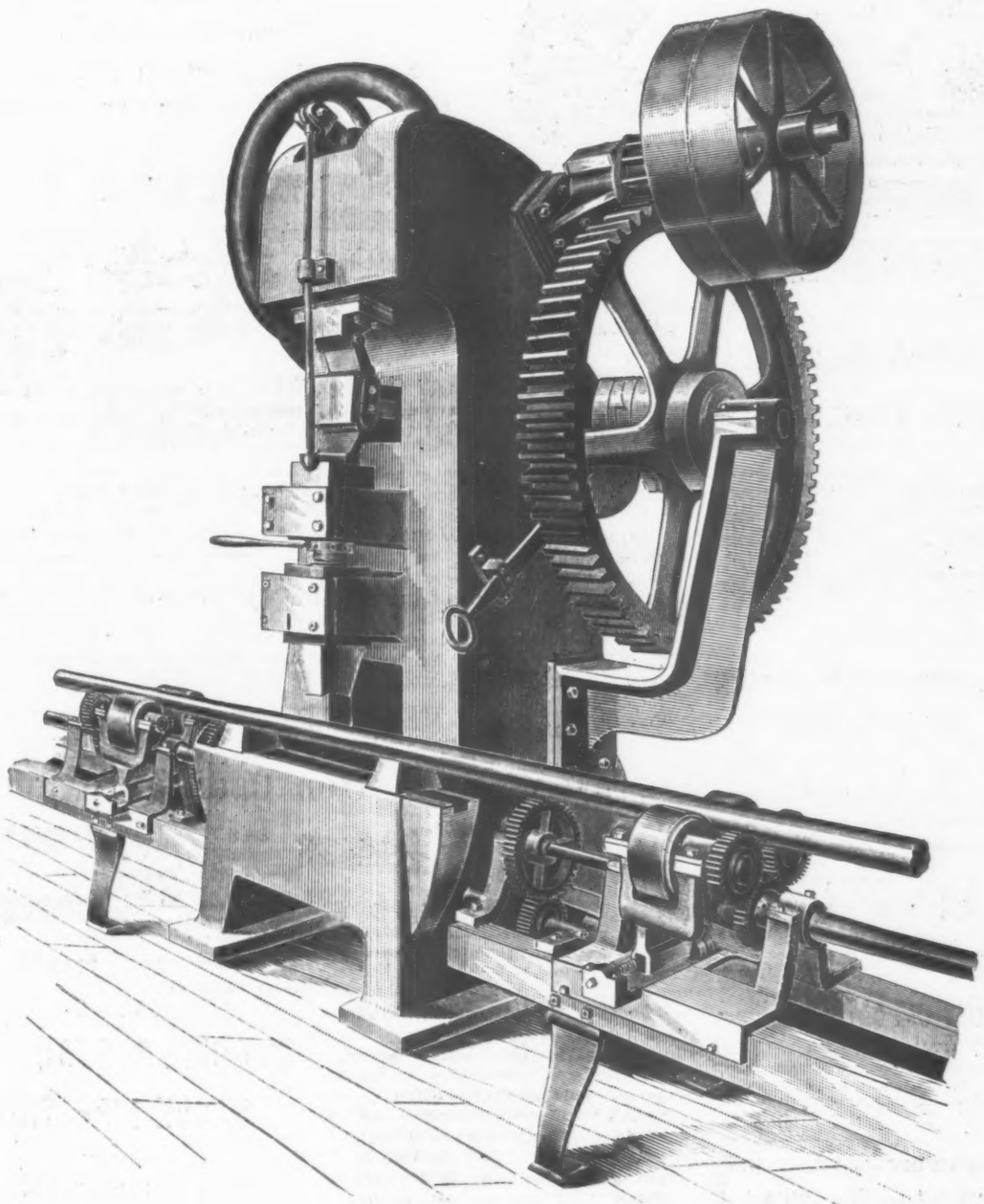
THE IRON AGE

THURSDAY, JUNE 11, 1891.

Power Press for Straightening Heavy Shafting.

The power press, operating in connection with a train of roll, as illustrated, is intended and built for the use of forges, iron works and large shaft makers. The press is designed to make the present tedious and expensive process of straightening heavy bars a rapid and an easy one. The shaft to be straightened is placed on revolving parallel rolls, when the kink or bend is easily detected by the eye. The outside or high place in crook is then chalked and the bar moved so that the chalked part is uppermost and directly under the plunger. A movement of the hand lever of the right side of the frame engages a crab clutch to cam shaft, on which a large gear wheel runs. The cam forces the connecting rod in frame of machine outward, and by means of a toggle joint the plunger is brought in contact with the bar with enough force to bend it. The arrangement of the crab clutch allows the plunger to return to its highest position and remain there until the operator is ready to use it again. This arrangement gives the operator plenty of room in which to move his work. A screw, working in a thread cut in the plunger boxes, admits of the plunger being raised or lowered to accomodate the various sizes of shafting. The press, as illustrated, will straighten shafting from 1 inch to 10 inches in diameter, and the length is only limited by the space on each side. The builders, the Brightman Machine Company of Cleveland, Ohio, also make a smaller press of the same general design for straightening both shafting and tubes, the former from 1 to 4 inches in diameter and the latter from 1 to 10 inches.



THE BRIGHTMAN POWER PRESS FOR STRAIGHTENING HEAVY SHAFTING.

Anti-Friction Metal Decision.—Several years ago the promoters of the Magnolia Anti-Friction Metal Company bought from Samuel Singley all his inventions in anti-friction metals or alloys. A judgment has recently been handed down by the Supreme Court of New York restraining Mr. Singley from divulging any of the formulas or trade secrets purchased by the above company, and from making or selling any anti-friction metal. This decision is of great value to the Magnolia Company, who, by well-directed effort and the inherent value of their anti-friction metal have established a lucrative business.

News has been received from Mexico that a large amount of German capital will soon be applied to the development of the petroleum deposits in the State of Tabasco.

SOUTHERN STEEL.

THE DUPLEX PROCESS DISCUSSED

(*Concluded from page* 1061, *June* 4.)

Cost of Plant.

I am not sufficiently familiar with the local conditions and cost of buildings to criticise the figures given for Ensley. I have, therefore, taken the estimates as if they were for a plant in Eastern Pennsylvania, with good railroad facilities and a cheap labor market.

The labor rates on which my estimates are based are as follows: Ordinary labor, 11 cents; bricklayers, 25 cents; good machinists, 25 cents; "handy" men, 15 to 20 cents; horse, cart and driver, 25 cents; carpenters, 18 cents, and stone masons, 15 to 22.5 cents—all per hour and ten hours to the day. Mr. Luetscher's figures are in all cases tabulated first.

Estimated Cost of Bessemer Plant.

	Luetscher.	Corrected.
Buildings, 70 feet x 100 feet x 50 feet	$10,000	$7,000
2 converters at $6000	12,000	20,000
2 cupolas at $4000	8,000	12,000
Blowing engine	12,000	18,000
Hydraulics	3,000	2,000
Hydraulic (pressure) pump		5,000
Hoist for cupola metal	2,000	2,000
400 horse-power of boilers	4,000	5,000
Boiler house and pumps	3,000	3,000
Casting shed, 60 feet x 120 feet, and chills for blown metal	6,000	10,000
12 pig-iron and 6 blown-metal ladles	12,000	10,000
1 locomotive for pig iron ($8000), and 1 for blown metal ($6000)	14,000	9,500
Cupola hoist and tower		2,500
7 pig-iron ladle cars		7,000
3 blown-metal cars		3,000
Platforms (depending on length)		10,000
Foundations and engine house		10,000
Bottom oven and grinding plant		3,000
2 Baker blowers and engine		5,000
Accumulator		1,000
Total	$86,000	$145,000
Unprovided for	14,000	30,000
Engineering and erecting		15,000
Grand total	$100,000	$190,000

Iron buildings substantial enough for all practical purposes can be erected for about $1 per square foot of area covered. $6000 is not enough for a 10-ton converter, with its supports and bottom jack. Such a converter will certainly cost $10,000, probably more if only one is erected. This does not include a stack.

A blowing engine can be bought for $12,000 which will do the work required. It would, however, be both cheaper and better in the end to have two engines, either of which could be forced to blow the heat alone if necessary. Such engines could be bought for $9000, but might cost $10,000.

I do not understand whether pumps are included in the estimate for hydraulics or not. The pipe alone would cost that much, in position, for a complete plant. I have taken the piping at $2000 and the pumps at $5000. Two Worthington duplex compound pumps with 9½ inch plungers would be needed for the entire plant, of which one should be charged to the Bessemer.

Four boilers of 100 horse-power each are not enough for this plant. Fully 1000 horse-power—*i. e.*, 10 boilers—will be required for the Bessemer and open hearth plants. One of these, and possibly two, would be spares. These spares are necessary to allow cleaning and repairs. If oil or gas firing be used probably eight boilers would be enough. $3000 is probably enough for boiler house feed-pumps and general service pumps, but would not include the water supply.

The casting house should be built as strongly as the rest of the buildings, as provision should be made for putting in cranes, if they should ever be needed. It would, therefore, cost $1 per square foot at least. This would amount to $7000 for the building. How much the chills would cost I do not know. I should think, however, that $3000 would fit them out fairly well.

The blast-furnace ladles would cost $500 and the blown-metal ladles $550 if fitted with stopper rigging—say, $10 000 for the 18 ladles. The locomotive for blast-furnace metal ought not to cost over $6000. If narrow-gauge tracks be used for blown metal, or if the ladle alone be run on a broad-gauge track, then a locomotive for this service could be bought for $3500. The other items I have included in my estimate are not in the other estimate at all.

A cupola hoist for stock is necessary. Seven cars for blast-furnace metal and three for blown metal are the least it would be practical to get on with. Probably ten would be found necessary for the blast furnace. This would give three ladles at the blast furnace, three in transit, three at the Bessemer and one spare. The platforms are a very uncertain factor, as so much depends on the length of the approach from the blast furnace. $10,000 would cover all the platforms inside the Bessemer building.

The foundations and engine house would certainly cost $10,000, and probably more. The latter I prefer to be made of brick, entirely separate from the other buildings. An accumulator is a necessity.

I have had considerable experience in building from estimates as incomplete as the above, and it leads me to believe that not less than 20 per cent. should be added for omissions and contingencies. It would be a piece of good luck if they did not amount to more in the present instance.

I do not think any competent engineer would design, furnish plans and superintend erection for less than 10 per cent. For this amount, however, he would supervise all purchases of machinery and have a competent man always on hand at the works. If the company erect the plant themselves, the necessary salaries to be charged against the construction account would not be far from the same amount.

In making a comparison between the plant proposed above and a standard two (10-ton) vessel plant, the following items are saved in the former—*i. e.*: a pit, pit crane, and four ingot cranes. The pit would cost about $1500, the ladle crane $3000, four ingot cranes $5000, tracks and foundations, say $3000. This would make a total of $12,500, say $13,000. Add this to the above estimate (mine) and it makes a total of $203,000. Such a plant could be built in this region for that amount of money, but it would require the closest kind of buying at the prices of 1884–5, and the utmost economy in building to insure this result. I should say that at least 10 per cent. more would be required at Ensley, and prices are higher than in 1884 and 1885.

Cost of Open-Hearth Plant.

	Luetscher.	Corrected.
6 20-ton furnaces with producers, platforms, &c.	$150,000	$150,000
2 cranes on trucks for steel ladles	10,000	10,000
Locomotive for above	6,000	4,000
3 hydraulic hoists	3,000	3,000
Casting pit	2,000	2,000
4 Wellman cranes	5,000	7,000
12 steel ladles	4,000	6,000
12 ingot trucks, 12 mold trucks	5,000	5,000
100 ingot molds	13,000	13,000
Hydraulics	8,000	8,000
4 boilers, 100 horse-power each	4,000	5,000
Buildings, 350 x 120 x 40 feet	45,000	42,000
Tracks, steam hammer, &c.	3,000	3,000
Total	$258,000	$258,000
Unprovided for	23,000	26,000
Engineering, &c.		26,000
	$281,000	$310,000

The estimates for the open-hearth plant seem to have been more fully and carefully worked out than those for the Bessemer plant. Without a study of the design for the plant it will be impossible to criticise most of the items. The price for the four Wellman cranes is too low, as at least three of these cranes should be fitted with power for racking and swinging movements. The ladles would cost $500 each with stopper rigging. Five boilers would be required, as explained above. The estimate for hydraulics seems to me high enough to cover the cost of the second Worthington pump.

As the estimates for this plant seem to me to be much nearer the probable cost, I have only added 10 per cent. for contingencies and 10 per cent. for engineering.

Cost of Blooming-Mill Plant.

	Luetscher.	Corrected.
4 heating furnaces, with producers, &c.	$20,000	$24,000
Charging crane	5,000	5,000
Mill, including engines, housings, rolls, tables and shears	50,000	
Mill and tables		16,000
Manipulator		2,000
Engines		17,000
Shears		24,000
Shear tables		2,500
Conveyer		3,000
Loading cranes		2,500
Crane for rolls	1,200	1,200
10 boilers, 100 horse-power each	10,000	10,000
Locomotive	6,000	4,000
Building, 80 x 250 x 30 feet	15,000	20,000
Foundations		10,000
Unprovided for	12,800	27,800
Engineering, &c.		14,000
Total	$120,000	$183,000

Five thousand dollars each hardly seems to me to be enough for the large heating furnaces required; $6000 would be nearer the probable figure. Fifty thousand dollars is not enough for the mill and the other items included under this head. The figures I have given amount to $67,000, and probably $70,000 would be nearer the true figure. Any mill now erected for rolling soft steel should be large and strong enough to finish blooms or slabs on edge up to 36 inches wide at least. The shears should be able to cut at least 36 x 7 inches.

These shears should be of the hydraulic type, with two powers and speeds. They would require special pumps or intensifiers. I think this plant could certainly be built for the sum named—*i. e*, $180,000.

Cost of General Items.

	Luetscher.	Corrected.
Office building and drafting room	$2,000	$2,000
Laboratory building and outfit	2,000	2,000
Testing machine, drills, &c	2,000	2,000
Electric light plant	7,000	10,000
Store house, oil house and repair shop	3,000	.....
Blacksmith and machine shops	.....	15,000
Store house	.....	1,500
Oil house	.....	1,000
Clay and brick shed	.....	2,500
Locomotive	8,000	6,000
Round house	1,000	1,000
Water works	6,000	10,000
Drainage	4,000	8,000
Tracks	6,000	10,000
Bridge	3,000	3,000
Total	$44,000	$74,000

Buildings which would answer for the office and laboratory could certainly be put up for $2000 each, but they would soon become inadequate. $2000 is not enough to put in a testing machine for the output of such a plant, most of which would be subject to inspection. The electric plant which could be put up for $7000 would not be enough for so extensive a plant, and one which would require both the arc and glow lamps.

The estimate for store houses and machine shop is utterly inadequate. The smallest machine shop which would answer for such a plant would cost at least $10,000, and $15,000 could be spent on it to the greatest advantage. The blacksmith shop would cost about $3500, including a 1000-pound hammer and ten fires.

A plentiful supply of water is a vital necessity in a modern steel plant. Of course I do not know the local conditions, which may be very advantageous as to location of source of supply and storage capacity. A plant with capacity for such a consumption would cost about $10,000 or more. This is based on a lift of 40 feet from the source of supply to the storage tank, all water to be used over again as much as possible. $6000 is not enough to drain so extensive a plant, even with a very short main or outlet drain. The drains throughout the plant should be so arranged as to admit of all the service-water pipes and hydraulic pipes being placed in them. This means that they must be large enough to give plenty of room to work on all these pipes.

The trackage allowed for seems to me to be inadequate, but of this I cannot be sure without some idea of the general design of the proposed plant. The bridge, of course, is a purely local item, and may be taken as estimated on. The summary would, therefore, be as follows:

Summary of Estimates.

	Luetscher.	Corrected.
Bessemer department, 2 vessels, 2 cupolas	$100,000	$175,000
Open-hearth department, 6 furnaces of 20 tons	280,000	284,000
Blooming Mill department, 4 furnaces	120,000	167,000
General items	44,000	68,000
Plans and superintendence. Engineering, &c	16,000	55,000
Total	$560,000	$749,000
		560,000
Difference	.....	$189,000

The item for engineering, &c., in my estimate, may seem rather high. It is, however, only 8 per cent. on the estimated cost of the complete plant. As this plant would require at least two years in which to build it, and would require almost the exclusive attention of the designer, I do not think this an excessive amount. A large force of draftsmen and assistant designers would be needed if the work was to be completed in two years from the beginning of the drawings. Besides this, a large amount of investigation and study would have to be put upon it, principally in Europe, before the final design could be decided upon.

My personal opinion is that the cost of such a plant in the South is more likely to be over $800,000 than under that amount. I have not considered his smaller alternative plant, as I think that its capacity is too small to allow the cost to be kept down even to my estimate.

In my opinion a working capital of $250,000 is entirely too small for such a plant, with a product of 1800 to 2000 tons of finished product per month. This amount of money would possibly be enough after the plant was in successful operation, with established credit. It would even then require very clever financiering to keep the concern afloat. This sum, however, is utterly inadequate to cover the inevitable "experience account" of the first year or two and also to provide working capital.

The company would have all the trouble of placing so large a product, made by a new process, at a distance from present markets. It would have the disadvantage of being far from the supplies of skilled labor such as it would need in the metallurgical department. Besides which the managers themselves would have to be educated, with very few if any places in which experience or information can be previously obtained. Even if a process is well understood and many of the men are accustomed to the work, it takes from three to six months to get a new plant into fairly smooth working order. The men require that long at least to learn how to work together to the best advantage. Add to this the fact that a little understood process has to be developed, and it can easily be seen that the task of making a commercial or even a technical success is by no means an easy one.

The company should be prepared to lose at least $150,000 in the first eighteen months. I do not believe that they could escape under this sum, and I think it much more likely that $250,000 would be sunk in that time. This "experience account" is inevitable.

In conclusion, I must say that I think the duplex process entirely unnecessary even in Ensley. Like working with direct blast-furnace metal, it is a very fascinating idea, but to my mind it is of very much less general application. It would require very peculiar local conditions for its success, and these conditions would be confined within very narrow limits. It seems to me that it would be much cheaper to import enough ore to enable the blast furnace to make suitable pig iron for either the basic Bessemer or open-hearth process alone, without attempting any form of duplex process at all.

I am sure this could easily be done at Ensley, and with proper blast-furnace management, the amount of ore necessary to be imported for making pig suitable for the basic open hearth would not be so very great. If basic Bessemer pig were wanted the problem would be a simple one, after a small amount of basic slag had been made.

If a duplex process is inevitable, then it seems to me that it would be better to line the vessel with basic mass as well as the furnace. If the silicon in the pig iron be kept down to 2.00 cent. the wear on the lining would not be so very great, considering the short time the metal would be in the converter. I suppose the vessel lining would last for 300 blows at least, and probably for more than that number.

Finally, I would respectfully recall to the mind of any intending investor Mr. Punch's well-known "Advice to a young man about to be married.—Don't," adding, "at least, not yet."

Record of Lake Steamers.

The great progress made in the cheap conveyance of heavy freight on our inland lakes is admirably illustrated by two series of figures for which *The Iron Age* is indebted to one of Cleveland's leading business men, identified for more than 30 years with its phenomenal development.

The following is the record of a steamer from the time it commenced fitting out to the end of its fourth voyage, June 25, 1888, it being assumed that she had no coal left in her bunkers, when as a matter of fact some fuel was left, of which no account was taken, however:

After having completed four round trips she had carried eight cargoes aggregating 15,022 gross tons, the average cargo being 1877½ gross tons. The mileage made during the four voyages was 7102 miles. The coal consumption was 533½ tons, costing at $2.37 per ton $1315.38. The average coal consumption of each trip of 1775½ miles was 138,775 net tons, which cost $328.84. The average cost for coal of carrying the average cargo of 1877½ gross tons 1 mile was, therefore, 18.6 cents, thus making the fuel cost of moving 1 gross ton 1 mile $\frac{1}{10}$ cent. The quantity of coal necessary to move 1 ton 1 mile figures out 1.3 ounce of coal.

The second boat was a new steamer with triple-expansion engines, 42 inches stroke and 24, 38 and 61 inch cylinders, equipped with Scotch boilers 14 feet in diameter and 12½ feet long, the working pressure being 153 to 160 pounds. The following is the record of this ship for the whole of the last season:

Average load, 2572.408 gross tons.
Average draft, loaded, 15 feet 10 inches.
Freight carried, 79,744½ gross tons.
Average mileage, 28 round trips, 1256.57 miles.
Total mileage, 35,184 miles.
Average speed, light, 13.0002 miles.
Average speed, loaded, 12.4237 miles.
Actual time sailing, 117 days, 23 minutes, 55 seconds.
Average time in port, 113 days, 12 minutes, 40 seconds.
Coal used per mile, light, 202.02 pounds.
Coal used per mile, loaded, 212.35 pounds.
Average, 207.20 pounds.
Average coal consumption per gross ton per mile, 1.288 ounces.

It will be observed, therefore, that the fuel consumption per ton of cargo per mile is a little more than 1¼ ounces of coal.

Tests on Corrosion of Iron and Soft Bessemer Steel.

On March 16, 1891, a piece of iron plate and a similar one of soft Bessemer steel, both clean and bright, were placed in a mixture of yellow loam and sand, with which had been thoroughly incorporated some carbonate of soda, nitrate of soda, chloride of ammonia and chloride of magnesium. The earth, as prepared, was kept moist. F. H. Williams, chemist of the Riverside Iron Works, Wheeling, reports that at the end of 33 days the pieces of metal were taken out, cleaned and weighed. Results: Iron, loss by corrosion, 0.84 per cent.; steel, loss by corrosion, 0.72 per cent. The pieces were replaced and left 28 days longer, or 61 days from beginning of test. Results: Iron, total loss by corrosion 2.06 per cent.; steel, total loss by corrosion, 1.79 per cent.

The Edison Electric Percussion Drill.

The Edison General Electric Company of New York have recently put upon the market in commercial form an electric percussion drill which is the invention of H. M. Marvin, of Syracuse, N. Y. It is an old and well known idea that a solenoid through which an electric current is passing may be so governed as to produce a reciprocating motion in an iron plunger. This is the principle made use of in this drill, but the methods by which it is carried out are new and original and have been found to produce better results than have been reached heretofore. From the patents granted to Mr. Marvin we take the accompanying drawings and descriptions of some of the apparatus by means of which this is accomplished.

In the construction of tools of this character it has been customary to employ two solenoids or electro-magnets adapted to impart by their alternate action a reciprocating movement to the tool. In the operation of such tool it has been customary to shift the current abruptly from coil to coil by some form of circuit controller. But it has been found that while such devices may answer where the amount of energy thus shifted is slight and the coils employed are small, when it is desired to employ large electro-magnets and great amounts of energy it is very desirable to give to the current an undulatory or pulsatory character—that is to say, to admit to the coil first an extremely small amount of energy and to gradually increase this current until a maximum is reached, when the current is as gradually reduced to a minimum again.

In one of the patents provision is made for operating drills by directing alternately into the drill coils currents, the impressed electro-motive force of which is maximum at the start or beginning of each impulse, falling to the minimum at the end of the stroke, whereby the maximum energy is applied at a time when the greatest proportion of work is to be done—that is, in reversing the direction of the core and starting it on its stroke, while the current falls off to zero at the time when the least energy is required and when the shifting of connection is made, thus avoiding spark.

The generator is so designed, and the wiring is such as to produce the necessary changes in the direction of the flow of the current and the resulting alternations in the polarity of the solenoids, thus avoiding the use of intermediate switches or current shifting mechanism and confining the sparking, when such occurs, to the generator.

Electrically Reciprocated Tool.

Figs. 1 to 3 inclusive show an electrically reciprocated tool. The improvement in this case consists in combining with the two coils of the drill and the two working circuits including the same a generator of alternating or pulsating currents adapted to develop in the working circuits alternately such pulsations as distinguished from a generator which produces pulsations of current in one circuit, from which they are directed into others. This plan has been found to be the most successful way of operating tools of this general description. It secures absolute precision in commutation or the directing of the current impulses through the two coils by the simplest form of mechanism. The tool is composed of a magnetic plunger and two oppositely acting coils, the generator having a single induced or current generating circuit, two working circuits from the generator to the tool, and a commutator or current shifter mechanically connected with the movable element of the generator and adapted to connect the terminals of the generating coils alternately with the working circuits.

A A represent the field magnets of a dynamo. The armature is a cylindrical magnetic core wound with a coil, B, which

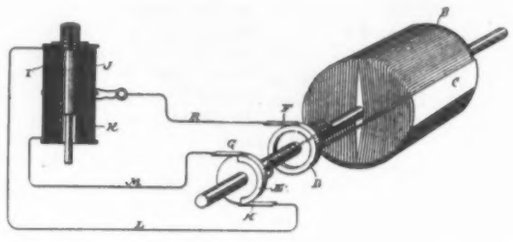


Fig. 1.

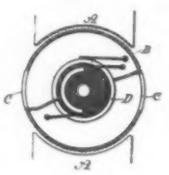


Fig. 2.

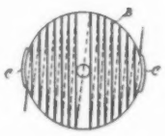


Fig. 3.

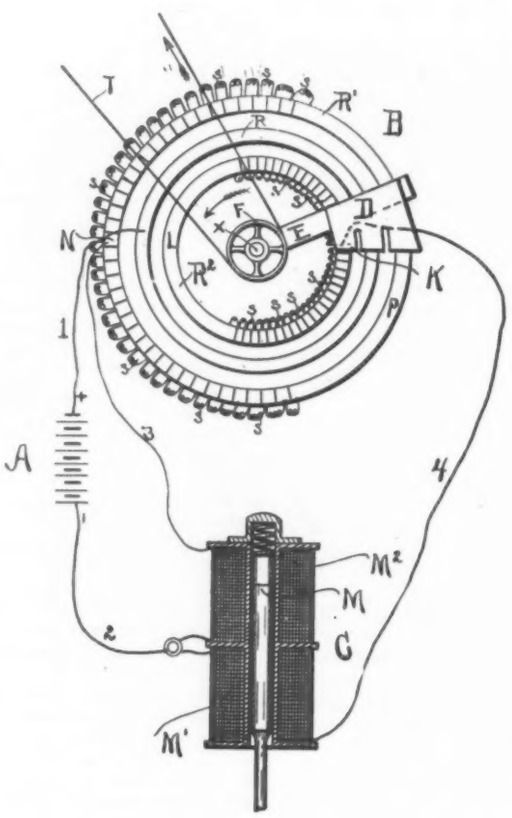


Fig. 4.

ELECTRICALLY RECIPROCATED TOOLS.

may be composed of any number of sections, but it may be considered as a single coil or induced circuit. On opposite sides of the core are secured projections C C around which the coil is wound and over the sides and ends of the core, generally in two sections meeting midway between the projections so that the wires at the ends are parallel. One terminal of the coil is permanently connected with a continuous ring D carried by the armature shaft. The other terminal is connected with a half ring, E, also carried by the shaft. Both rings are insulated from the shaft. A single brush, F, bears upon the ring D and two brushes G H are placed in position to be alternately in contact with the half ring E. These brushes form the terminals of two electric circuits, of which the conductor R forms the common return.

The drill consists of a magnetic plunger, I, which carries the drill and two oppositely acting coils J K, which, by their alternate attraction, reciprocate the core. One of the coils, as J, is connected with the working or line circuit formed through wires L and R, and the other with the circuit formed by wires M and R, so that the current pulsations developed in or delivered

into these circuits alternately will produce a reciprocation of the plunger. This is effected by the relative positions of the half ring E and the brushes G H, which is such that the coil B is connected with each circuit alternately at or about the time when from its position relatively to the field of force it begins to develop a current impulse or alternation.

Another Method of Operating the Drill.

Another method of accomplishing this is shown in Fig. 4. B represents an end view of a current distributor whose function is to alternately direct to the two coils M^1 M^2 currents of a pulsatory nature, or currents gradually rising and falling from minimum to maximum. R R^1 R^2 are three concentric contact rings, R being a continuous plate to which the conductor 1 is connected, and R^1 R^2 being subdivided rings, the adjacent blocks or sections of which are connected through resistance coils *s s s*, after the manner of rheostats. The blocks L and P of the rings R^2 and R^1, respectively, are of greater width than the other blocks in the rings. To the block N, the middle of the series in the ring R^1, is connected the conductor 3, while to the block K is connected the conductor 4. The insulated arm E swings around on the post X and is driven by the pulley and belt F T. The arm carries the brush D that establishes sliding connection between the three rings. The coils *s* increase in resistance from the blocks N and K to the blocks P and L respectively.

Fig. 5.

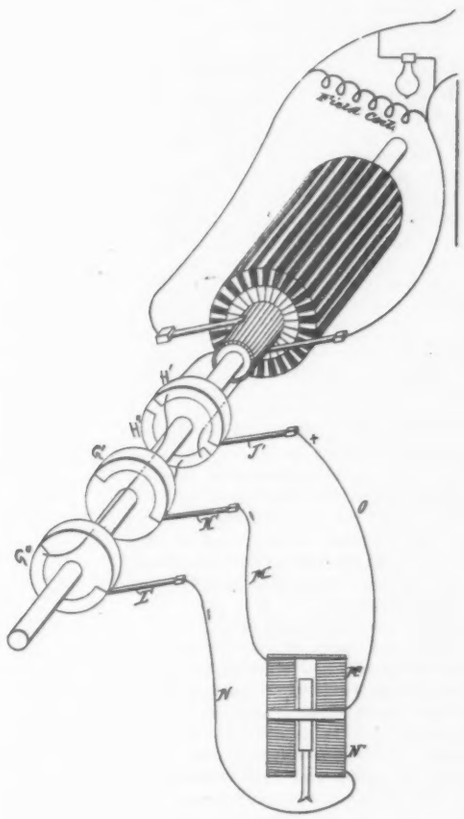


Fig. 6.

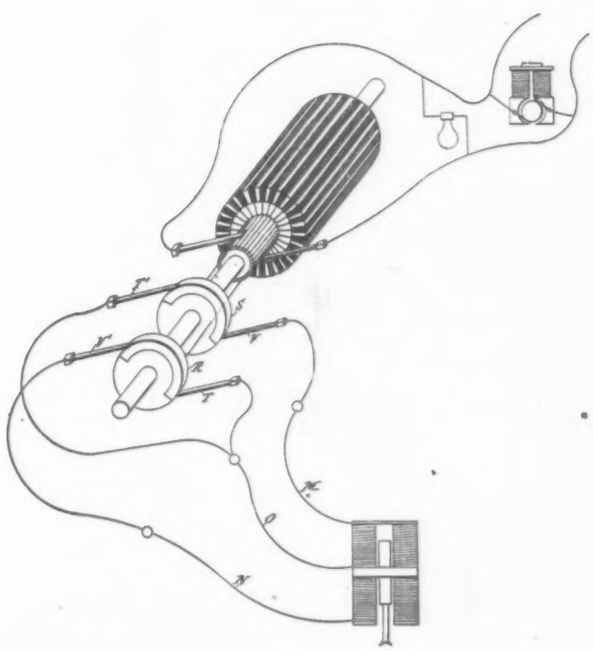


Fig. 7.

ELECTRO-MAGNETIC DRILL SYSTEM.

The action of the system is as follows: Suppose a current to start from the battery A and flow thence through the conductor 1 to the plate R. Thence it passes through the brush D to the ring R^2 by way of block K at the instant shown. From block K it flows through conductor 4 to coil M^1, and through coil M^1 to conductor 2, and thence by conductor 2 to battery A, completing the circuit. Thus it will appear that coil M^1 is energized by a current of maximum intensity unimpeded by any external resistance, and the bar M is drawn down into coil M^1. The current at this moment energizing coil M^2 is extremely feeble, since in leaving brush D and passing to block P of ring R^1 the current is compelled to pass through all of the coils *s s s s s s* in order to reach conductor 3, connected to block N, and these coils are in the aggregate of extremely high resistance. Now, as the brush arm E and brush D revolve around the post X, the brush D makes contact with the coils *s s s* successively, and thus

gradually introduces these coils into the circuit, thereby increasing the resistance of the circuit and reducing the current flowing through the coil M^1. When the resistances connected into ring R^2 have been largely introduced into circuit with the coil M^1 and the current therein has become considerably reduced, brush D begins to make contact with the blocks in the ring R^1 and to cut out the resistance coils *s s s*, connected in this ring, from the circuit of the coil M^2, and the result is that the current in the coil M^2 begins to increase. This action continues, the current increasing in coil M^2 and diminishing in coil M^1 until it has become extremely small in coil M^1 and a maximum in coil M^2, and plunger M is thus drawn up into coil M^2.

An important feature is the arrangement of parts adapted to start the current in one coil while it still has considerable strength in the other, as thereby the stroke is cushioned when the tool meets no object, and, further, the plunger is never left without an exciting current, and in consequence its magnetism never falls much below the saturation point, and the heating incident to great fluctuations of magnetism is avoided.

Electro-Magnetic Drill System.

The principal feature shown in Figs. 5, 6 and 7 is found in the generator, which is constructed with the special object in view of supplying to one set of conductors a direct or continuous current, and at the same time supplying alternately two other sets of conductors with rising and falling current pulsations.

A, in Fig. 5, is the shaft of the generator. The field magnets for this and the other generators are not shown, being of any ordinary construction. The armature is wound with a continuous coil, B, which at a number of points is connected with the segments of a commutator, C, the construction so far being like the Siemens or Gramme machines. The brushes D D bear upon the commutator and deliver continuous currents into a circuit, E E, which includes the field-magnet coils and may also include such devices as a direct-current motor, F, or electric lamps or other devices which require for their operation a direct current. Secured to the shaft, but insulated from it, are the half ring G and the complete ring H, connected, respectively, to diametrically opposite points of the armature circuit. Two brushes, K L, are in position to bear alternately upon the half ring G, and from these brushes lead the conductors M N of two circuits, which include the coils M′ N′ of one or more reciprocating tools, and have a common return wire, O, which leads to a brush, J, that bears continuously on the ring H. By means of this construction it is evident that in addition to the commutated current delivered into the circuit E a rising and falling current impulse will be delivered into each of the circuits M O and N O for each revolution of the armature, and it will also be noted in this case that while the current impulses in each of the conductors M and N will be in one direction those in the return wire O will alternate in direction.

In Fig. 6 an equivalent result is secured by a somewhat different disposition. The armature commutator and circuit E are the same in this case as in Fig 5. The shaft, however, carries a ring made up of two segments, H′ H″, and two half rings, G′ G″. The segments H′ H″ are connected, respectively, to two opposite segments of the commutator C and the two half rings G′ G″ are connected, respectively, with the segments. Three brushes are employed. Brushes K′ and L′ are in positions to bear upon the half rings G′ and G″, respectively, the latter being in such relation to the brushes that contact is made with one ring at a time. Brush J′ bears upon the segments H′ H″ alternately. The arrangement of conductors M, N and O is the same as in the former figure, and during the movement of the generator rising and falling current impulses are delivered in alternation by brushes K′ J′ into circuit M O and by brushes L′ J′ into circuit N O. By this disposition it will be noted that the impulses in each conductor M, N or O are all in the same direction.

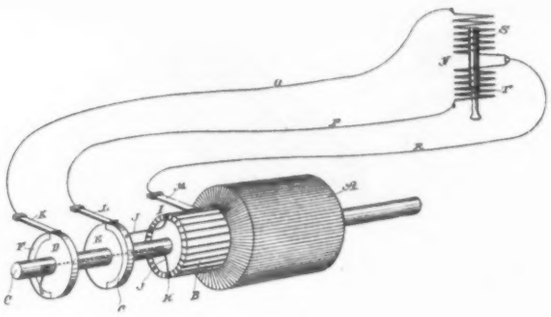


Fig. 8.

ELECTRIC DRILL SYSTEM.

A third disposition is shown in Fig. 7. In this case two insulated half rings, R S, carried by the shaft A, are connected to diametrically opposite commutator segments. With each half ring two brushes are employed in such position that the half ring on leaving one brush comes in contact with the other. One brush of each set, as T T′, is connected to the return wire O, and the others, as V V′, are connected, respectively, with the wires M N. By this disposition rising and falling current impulses are sent in alternation through the drill coils, the impulses in each conductor being all in one direction.

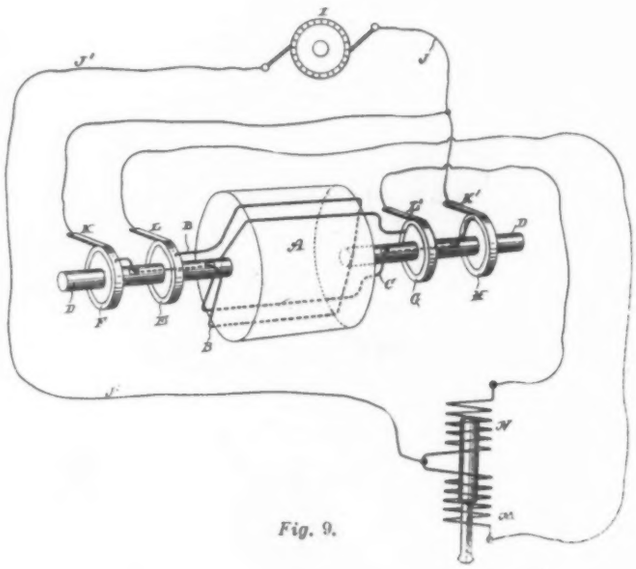


Fig. 9.

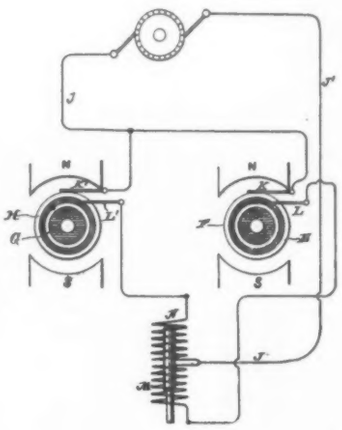


Fig. 10.

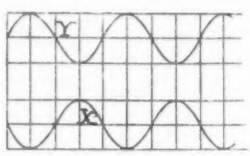


Fig. 11.

ELECTRICALLY RECIPROCATED TOOLS.

Electric Drill System.

Fig. 8 represents a method of operating drill by directing alternately into the drill coils currents the electro-motive force of which is maximum at the start or begin-

ning of each impulse, falling to the minimum at the end of the stroke. On the shaft of an ordinary continuous current machine are secured insulating disks, to the peripheries of which, on opposite sides of the shaft, are secured plates covering a half circle. These segments are connected, respectively, to diametrically opposite commutator segments and the brushes bearing on them are connected by suitable conductors to the two drill coils S T. The opposite ends of the drill coils are joined to a conductor leading to a single brush that bears on the commutator, and which is in such position with reference to the other brushes that when the segment or plate on one disk is just about to come in contact with its brush, the commutator segment to which the plate is connected will be 180°, or nearly so, from the point of contact between the commutator and the brush bearing thereon. It follows from this that currents are delivered in alternation to the two drill coils, and that the electro-motive force of the currents is at maximum at the beginning and falls to a minimum at the end of each stroke.

Electrically Reciprocated Tools.

The method shown in Figs. 9, 10 and 11 employs an alternating current machine having two windings on its armature and four collecting rings, to which the terminals of the two windings are respectively attached. With such machine is associated a direct or continuous current machine, one branch of the circuit of which is divided and carried by suitable connections through the two circuits of the alternating current machine in such a way or direction that while the current in one coil will be opposed by the direct current it will be re-enforced in the other. The other branch of the circuit from the continuous current machine leads to the junction of the two drill coils, and the ends of these latter are connected to the free terminals of the alternating current generator. As a consequence, each drill coil will receive an undulating or alternating current of rising and falling potential, the periods of maximum potential of one current coinciding with the minimum periods of the other, and conversely.

The armature A of the alternating current machine is wound with two coils B C arranged to produce currents of the same phase. The armature carries four collecting rings E F G H, the first two being connected with the respective terminals of the coil B, the others with those of the coil C. I is a generator or source of continuous currents, the wiring being as plainly shown in the drawings.

By the rotation of the armature A the electro-motive force of each coil or winding B C is alternately added and opposed to that of the continuous-current generator I in the two branches of its circuit, respectively. Assume now that the armature is in the position of a beginning of a period or current alternation. Then the current from generator I is passed through each drill coil without modification. For convenience it will be assumed that this is a current of 100 volts. The maximum electro-motive force of the armature A may be further assumed to be 100 volts. As the armature A rotates, the electro-motive force developed by one of the coils, as B, which is connected with rings E F, is of such sign as to make brush K of positive and brush L of negative sign; hence the electro-motive force in this branch of the circuit opposes that of the generator T. The electro-motive force of the coil C, on the other hand, from the order of its connections with the brushes K′ L′, makes brush L′ positive and brush K′ negative. The electro-motive force of the generator I, therefore, through coil B meets an increasing opposition, while that through the coil C is gradually re-enforced or augmented. When the armature A has made one quarter of a turn the opposing and re-enforcing electro motive force developed by its coils has reached its maximum or has become 100 volts, which is the same as that developed by the generator T. The impressed electro-motive force of the circuit through the coil B has therefore become zero, while that through coil C has become maximum or 200 volts. The rings then change sign, and the electro-motive force of the circuit through coil B is therefore assisted, while that through coil C is opposed; hence the electro-motive force through coil B continues to rise through the next quarter of a revolution up to a maximum, while that of coil C, which is opposed, falls to zero. This action continues alternately, as will be now understood. The curves of the currents from coils B and C are represented by X and Y respective in Fig. 11.

The system has certain advantages of considerable importance, as commutators for directing the current into the two drill circuits are dispensed with and sparking avoided. It will also be observed that the coils of the drill are each continuously supplied with pulsating currents, the direction of which is always the same. The magnetism of the drill core is therefore never reversed:

Description of a Drill.

From a paper recently read by H. Ward Leonard before the Association of Mining Engineers of Quebec we take the following description of one of these drills:

Fastened upon a suitable tripod or column is a piece of boiler tube 7 inches in diameter and about 2½ feet long. In the forward half of this casing are placed two hollow cylindrical coils of wire in the form of solenoids, each about 8½ inches long, having an outside diameter of about 6¾ inches so as to make a loose fit with the casing, and an inside diameter of about 2½ inches. These two solenoids are placed so as to be against each other end to end in the casing. The bit plunger plays freely through the center of these solenoids, and is supported by two bearings placed just beyond the outside ends of the two solenoids respectively. The back portion of the casing contains a spiral spring of the form frequently used for car springs. The plunger is composed of a central portion made of wrought iron about 14 inches long, and both the forward and back portions of the plungers, which are made of aluminum bronze, are rigidly fastened to this iron portion. The forward portion in about 13 inches long, and carries the bit socket. The back portion is spirally milled for a length of about 9 inches, so that the cross section of this portion is hexagonal. At the extreme back end is a steel buffer which strikes against the cushioning spring. The spirally milled portion of the plunger is similar to that used in other percussion drills and causes the drill to revolve upon itt axis one-sixth of a complete turn with each stroke.

The ends of the coils of wire are brought to contact pieces at the top of the adjacent ends of the two solenoids, where there is a socket for receiving the terminals of the cable, and thus making electrical connection with the drill. There are three conductors leading from the generator to the drill, one of which is connected to one terminal of each of the solenoids, and the other two conductors are connected to the two remaining terminals of the solenoids respectively.

The generator is of the simplest kind, the coils on the armature having their terminals connected to two insulated collars on the shaft. One collar is a continuous metallic ring, and upon this rests a brush which is connected with that conductor which is common to both solenoids. The other collar is metallic for half of the circle, and the remaining half is insulated from the armature wires. Upon this half ring rest two brushes diametrically opposite each other, and each brush is connected to one of the two remaining conductors leading to the solenoids in the drill.

The operation of this drill will be readily understood from the descriptions we have already given.

Fuel Gas at Springfield.

For more than two years past the Springfield Iron Company of Springfield, Ill., have been conducting a series of experiments having in view the improvement of the manufacture of fuel gas for metallurgical and other purposes, and saving as by-products the ammonia and tar which are always generated in the manufacture of gas, but which have never heretofore been secured from any gas but illuminating gas made in closed retorts. These experiments have been under the direction of Dr. Alphonse Hennin, who has devoted a great deal of time and study to this branch of industrial chemistry. The result of these experiments has been the invention by Dr. Hennin of a process for making a fuel gas containing as high as 60 per cent. of combustible matter, and at the same time obtaining larger quantities of ammonia and tar per ton of coal used than have ever before been secured by any process. A United States patent has been allowed covering the invention with broad claims, and applications have been made for patents in all of the principal countries of Europe.

The Springfield Iron Company have now in operation at their works two large producers 10 feet in diameter and 15 feet high, making gas by this process, and are building three more of the same size. These, when completed, will consume 40 to 50 tons of coal per day, and make 5,000,000 to 6,000,000 cubic feet of gas per 24 hours.

The apparatus consists of cylindrical producers, 10 feet in diameter and 15 feet high, made of wrought iron and lined with fire brick. The fuel is fed into a hopper at the top of the producer, and the bed of fire is supported on a grate near the bottom. The combustion which generates the heat for distillation is maintained by blasts of steam and air, which are introduced radially through tuyeres just above the grate. The novelty of the invention consists in so regulating the relative proportions of steam and air as to maintain in this lower portion of the producer an incandescent zone or bed of fuel at a sufficient temperature to decompose practically all of the steam admitted, and at the same time so regulating the supply of fresh fuel that the upper portion of the producer is kept at a temperature sufficiently low to allow the formation of ammonia and prevent its decomposition.

On June 2, General Manager C. M. Hudson, General Superintendent. W. A. Vaughan, General Solicitor Wm. A. Baxter, General Traffic Manager Edwin Fitzgerald and other officials of the East Tennessee, Virginia and Georgia Railroad paid Mobile, Ala., a visit of inspection of the new docks and facilities for handling coal for water shipments, erected there recently by their system, similar and in opposition to those at Pensacola, Fla., of the Louisville and Nashville Railroad. The test of the entire plant was satisfactory, and they hope to make Mobile one of the largest coaling ports on the Gulf of Mexico. With these facilities at Pensacola, Mobile, and those at Greenville, on the Mississippi River, of the Georgia Pacific Railroad, there will undoubtedly be a large amount of Alabama coal from the Birmingham district shipped for home and export consumption, which will necessarily curtail consumption of Pittsburgh and West Virginia coals, heretofore holding the river and gulf markets, especially as output and development of the Southern mines are being developed to keep pace with the demands. Recently 5000 tons were shipped from Blockton, Ala., by the Export Coal Company to Pensacola and loaded into vessels for foreign ports—consuming only four days from the time the coal left the mine until it was *en route* by water.

The Practical Aspects of Electric Welding.*

BY FREDERIC A. C. PERRINE, TRENTON, N. J.

The plant with which I have been intimately connected, though not one of the heaviest, is still one making a great number of successful welds in a day, and is one in which the joints are required to be of the highest character and are subjected to the severest tests. The first machine actually sold by the Welding Company was bought by the Roeblings. This was of the direct type, having a double winding on the armature, and the welding done on an apron immediately above the collector terminals of the heavy alternating coils; the pressure was applied by a handle regulated by the workman, the projection also being regulated by a scale stamped on the cam of the handle. Though considered crude, this machine did satisfactory work, often for 24 hours a day and six days in the week, for about two years, having made about 370,000 splices in telegraph wire during its useful life.

After the automatic machines were brought to a reasonable perfection we purchased a generator capable of welding up to ½ inch copper (40,000 watts) and installed one large transformer and seven smaller ones of capacity from No. 4 B. & S. copper to No. 18 B. & S. These have been at the works something less than one year, and show a daily record of over 1000 welds in copper and iron wire.

Seward & Son of New Haven, Conn., have at work a machine of somewhat universal character, its employment being principally in uniting Norway iron to Swedish steel, in such shapes as are required in carriage irons and fifth wheels. In this work the burr is removed by a drop hammer at the same heat by which the weld has been made.

The crescent tires of the hundreds of bicycles manufactured by the Pope Mfg. Company are welded and afterward formed by dies at the same heat. The material is soft steel. These people also have a machine for brazing their small parts.

Besides using the electric welding machine for their telegraph wire, the Trenton Iron Company of Trenton, N. J., have boldly attempted to make a weld in a wire rope to avoid the tedious, and, with their locked wire rope, impossible, operation of splicing. With the locked wire rope, which is itself but a single strand, the only successful method of joining opposite ends has been to fasten securely around each a cast-iron collar, and after abutting the ends in a welding machine, to cement the whole together and afterward to break off the cast-iron collar, leaving the rope as a solid bar for about 2 inches at the weld.

Among the new solutions of old problems accomplished by the electric welding process is that of the manufacture of spinning rings by the Hopedale Machine Company of Hopedale, Mass. With a welding machine it is possible to form these little rings, about 2½ inches diameter, from a piece of bar iron, and after the burr has been reduced by a series of dies, to finish as before, with the result of a decreased cost and an equally satisfactory product.

One of the largest and most complete plants at present in operation is that of the Studebaker Bros. Mfg. Company of South Bend, Ind. They have at present nine machines, one of them for steel axles up to 1½ inches square. After the weld is made it is quickly removed to a drop hammer, making about 300 blows a minute; then at the same heat the axle is set ready for the market. The test for these axles is to bend to 90° while hot, and then back to alignment. No instance has yet been reported of an axle breaking under this test, which is frequently made to insure perfect workmanship.

They have also two machines for welding large car tires, about 4 inches wide and ¾ inch thick, and smaller sizes. The weld is made in the usual way, and then quickly removed to a hammer, where, by vertical and side blows, the burr is quickly removed. One hammer will easily take care of two welders in constant operation. They also have one machine for small carriage tires, 1 x ¼ inch, and smaller sizes. In this case the burr is removed by one blow of the hammer.

Probably the heaviest work done at present in electric welding is that of the Johnson Company of Johnstown, Pa. As to their results in general they say: "We would state that over a year ago we put in one welder for general work. The result of a year's use of the electric welder was that we have not known one of the welds made by the method to fail, and we have closed contracts with the welding company for four 40,000 Watt machines and two 89,000 watt machines, with the intention of adopting the method extensively in our works."

The hardest steel at present successfully worked by this process is the welding of band saws by the E. C. Atkins Company of Indianapolis, Ind. Besides the regular work of making the joint in continuous band saws, these people have ingeniously adopted this method for replacing broken teeth in finished saws.

Pipe welding is put in practice by the Pennsylvania Railroad Company, as well as by the Columbus Iron Works, Columbus, Ohio; Blymyer Ice Machine Company, Cincinnati, Ohio, and the Electric Pipe Bending Company, of Newark, N. J. This latter company is engaged principally in manufacturing long continuous coils for ice machines, blast furnace tuyeres, and radiators. With this machinery they not only weld extra heavy black pipe, but also electrically heat the pipe with a machine 20 inches between the clamps for the purpose of bending to desired shapes over pipe formers.

With continuously spiraled coils of pipe, under the present electrical methods, the coils are continuously heated in a fire, and the coiling is continuous while one length of pipe is welded at a time, the operation being to attach the welding machine to the end of the moving pipe, and while the forward portion is undergoing the process of bending, to weld on a new length, which will be accomplished in a sufficiently short time not to interefere with the coiling apparatus. In all this pipe welding the burr is beaten down by means of a pneumatic hammer, which is put in rapid motion by the act of closing it around the pipe.

Three types of machines of importance are soon to be in use for the purpose of our army and navy, and the early recognition of the importance of this method of manufacture speaks well for the ingenuity of our Government designers.

In the new wire-wound guns one of the most important specifications for the wire was that it should be readily jointed by the electric welding process, and in the Crozier gun, now constructing, the wire will be wound in one continuous piece under a constant and heavy strain. This wire is $\frac{1}{16}$ inch square, with 180,000 pounds breaking strength, and 100,000 pounds elastic limit, tinned as lightly as possible. The gun is to be made by winding the wire over a steel tube and shrinking a ring over the whole, for the purpose of longitudinal strength; the welding process is simply the same as that described for round wire, and is reported as having given satisfactory results.

For the Charlestown Navy Yard there is about completed a machine for welding ship chains up to 2 inch diameter links. These links are formed in halves and fitted roughly to each other, the welds being made in both sides at once by the same heat, which can be regulated to force either side at the will of the operator. When completed, both welds are forged immediately in a die by the same hammer.

Electrically welded shells are made entirely of forged point, body and base, which may be finished to approximate dimensions, these requiring after welding a minimum amount of machining. The tests on these shells have resulted in a contract for a large number under a guarantee of the manufacturing company.

The electric welding process uses rather the method of the crucible than of the press, for although considerable pressures are applied during the operation they are not beyond the limits of ordinary forging, and the essential difference is the greater heat available at the direct point where it is most needed, a heat which approaches and often reaches the melting point of the material. As the pressure is applied it is transmitted by the cold bar directly upon the softened metal and forces it to unite more readily. This view of the process brings us at once to some of the most important limitations; cast iron, cast steel, cast copper, cast brass are not changed in their essential constitution, but are united by a weld having all the characteristics of the original bar. Now let us take a bar of rolled zinc or drawn copper and compare it with the cast metal. We find the crystals, formerly large and widely separated, especially in the case of zinc, where often internal oxide stains are perceptible, now are broken into minute fragments, elongated and united so closely as to allow the greatest opportunity for the action of cohesion. Weld such a metal as this, and the joint where broken will immediately show a rearrangement of the particles into larger and looser crystals similar to those of the unworked metal. By repeated fracture of the bar you will be able to follow graduations of the action till it loses itself.

A weld of this character will give a sufficient tensile strength, but the brittleness of a coarsely crystalline material has returned. Whether such a joint is worthless is entirely a matter of circumstances. With small sections the action is not perceptible on account of the very small length heated, and also because bending, however short, does not subject the metal to so great a strain as is the case with larger sections. For a rod to be subjected to further drawing, rolling, or other like processes of manufacture the weld is satisfactory, since the subsequent working reinstates the metal to its best condition, but for a wire to be considered a finished product further manipulation is necessary. In view of this, the later machines for welding heavy copper have been provided with reheating clamps and light rapid hammers, by means of which the burr, after a slight trimming, can be reheated and forged; in special cases a further hammering cold is added. Though this produces a great improvement in the metal, it yet leaves a good deal to be desired where great strength and pliability are required. To produce this a further upsetting of the metal throughout the whole heated space and a subsequent forging will be necessary. This, up to the present time, has not been provided for, and presents a greater difficulty than is at first apparent, besides furnishing a new proof of the crystalline constitution of copper. On account of this characteristic, as is apparent on attempting upsetting in the welding machine, it offers, at a red heat capable of moving and rearranging the particles, a resistance to compression so high that three or four times the pressure necessary

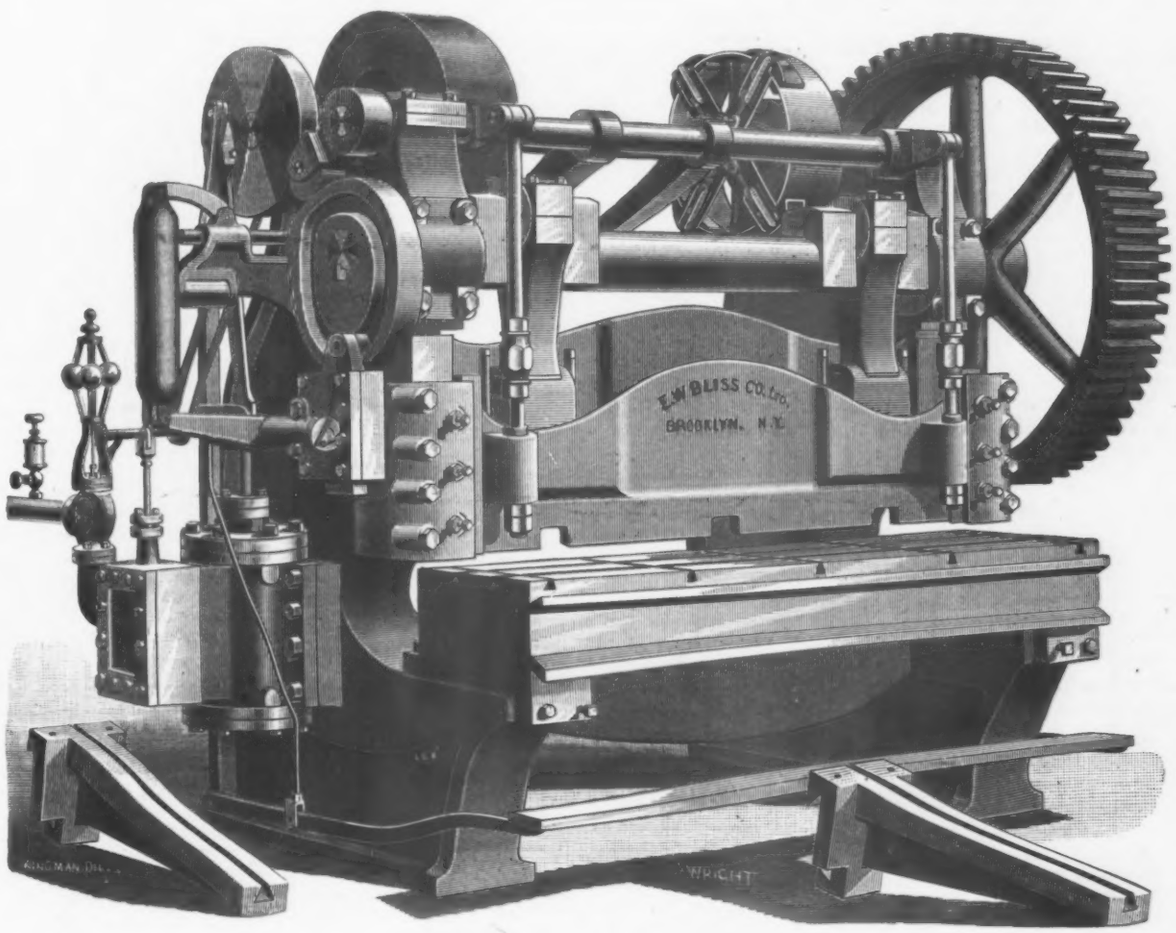
* Abstract of a paper read at the meeting of the American Institute of Electrical Engineers, New York.

for welding will not have the slightest effect toward increasing the diameter or upsetting. With bronzes the further difficulty is encountered of red shortness between the molten temperature of the weld and the malleable red temperature. That this should be so necessary and offer so many difficulties may seem strange, since the metal does not apparently exceed the temperature of ordinary annealing, and it must be that either the passage of the current by an extra disturbace helps to rearrange the particles, or else the temperature is greater than we imagine from an observation. The latter explanation seems to me to be the more likely, since our ordinary observations are made on metals heated from an external source, and of which the surface is at the highest temperature. With the weld, however, the source of heat is internal, and the surface is undergoing a continual cooling from the external air.

Welds made in the higher carbon steels are at a similar disadvantage, and must be looked upon with disfavor unless provision for upsetting and forging hot is made.

This brings us to a point where the electric welding throws light upon the actual production and nature of burnt steel. By forcing the heat in welding, no matter if rapidly, this effect can be produced as thoroughly as by the means of a fire, while if the name "burnt" was an accurate description, and the iron and carbon oxidized, a sufficient time would be necessary for its penetration into the center of a bar of metal. This agrees with and is a further confirmation of the most modern ideas about burnt metal, that it is a molecular rearrangement, and by careful forging and heating the metal can be restored to its original state. In this case oxidation certainly does not take place, though the action may be similar to metamorphism in rocks; steel being at the present day looked upon as a mineral, a matrix of iron including minerals, which are generally compounds of iron with carbon, silicon, sulphur, manganese or phosphorus. Under this view there may be internal chemical rearrangment at high temperature. With carbon we know this to be the case, but I take it as settled by electrical heating that the change is not necessarily an oxidation.

The welding of two different materials, such as iron and steel or malleable cast iron, presents another difficulty and possible danger. When such a weld is broken we find that the pressure in the plastic state has forced the iron over the steel or malleable, which has itself been merely slightly melted and cemented to the adjacent particles of the iron. This produces what might be called a reverse riveting, the hot iron having been upset over the steel and inclosing it tightly, in the place of having been upset in a hole as in ordinary riveting.



HEAVY CUTTING SHEAR.

Heavy Cutting Shear.

The shear illustrated is one recently designed by E. W. Bliss Company, Limited, Brooklyn, N. Y., for cutting ¾-inch plate, and possesses some new features, the principal one of which is the device used for stopping and starting the machine. Heretofore shears of this character have been supplied with a clutch on the main crank shaft, on which latter, when the clutch is in operation, the driving gear runs loose. The improvement consists in keying this gear rigidly to the crank shaft and placing a friction clutch upon the pinion or fast-speed shaft. The shifting bar operating this clutch is connected with a lever and counterweight, shown at the left-hand side of cut. On the main crank shaft is a cam operating a slide working in vertical guides upon the housing. The mechanism is so arranged that when the cranks are in their upper position, so that the shear knives are open to receive the work, a latch in the slide acts to raise the counter weight and hold the friction clutch out of gear, thus allowing the cutter bar to stand at rest. Depressing the treadle throws the latch out of gear, allowing the weight to drop, which action throws the clutch into operation and starts the machine. When the crank shaft has made one revolution the cam above referred to depresses the slide, thus lifting the counterweight and stopping the machine. As these motions are very easy, there is said to be no shock or jar in starting, and as the train of gearing is at rest when the cutter bar is not moving, the shaft is held securely with the cranks at their top center, with no tendency to drop back or ahead, even though no counterweight is used to balance the cutter bar.

The cutting blades are 8 feet 4 inches long, and there is sufficient gap in the housings to allow of a plate 36 inches wide being split through the center. Immediately in front of the cutter bar is a clamping bar, which, when the machine is started, automatically descends and securely holds the work in place while the shearing is taking place. The machine is geared about 20 to 1, and is driven by a plain slide-valve engine, 12 x 15 inches, which is attached directly to the housing. The crank shaft is of hammered steel, with cranks forged solid and slotted out. In order to compensate for wear of the blades, the lower one is supported on a long wedge, by setting up on which the cutting edge of the blade is kept level with the table. The upper blade is adjusted downward by lowering the cutter bar bodily. The machine weighs complete about 45,000 pounds.

The Daimler Gas and Petroleum Motor.

The gas and petroleum motor we here illustrate is the invention of Gottlieb Daimler of Cannstatt, Germany. It has been in successful operation in France and Germany for some time and is now being introduced into this country by the Daimler Motor Company whose works are at Steinway, Long Island City, N. Y., and whose branch office is at 111 East Fourteenth street, New York City.

The motors are built in sizes varying from 1 to 10 horse-power and in several modified forms to adapt them to various uses, the smaller sizes being designed for convenient connection with machines requiring only a small amount of power, while the larger are suitable for driving dynamos, grinding mills, boats and the like. Although all the parts of the motor are so proportioned as to perfectly stand the working strain, the motors are smaller and lighter than any others belonging to the same general class. They run at a high speed and are arranged so that they can be started in less than a minute, and may be run independently of either gas or water mains. When operated by petroleum gas they run with still greater economy than with ordinary illuminating gas.

The base of the motor consists of a cast iron, gas tight, circular chamber, with a valve inlet for combustible mixture or air. In the base are placed two disks, mounted upon the two sections of the main shaft and connected by a crank pin, the disks serving the double purpose of a crank and fly wheels. In one of the disks is formed a double slip cam groove, which passes twices around the crank shaft, and returns into itself. In this cam groove is placed a follower, shown in Fig. 5, which operates the valve gear so as to make every alternate stroke a working stroke. Upon the base are mounted one or more working cylinders, according to the power required. When two cylinders are used, they are either arranged parallel with each other or joined at the base so as to spread out at the top, forming a slight angle, as shown in Figs. 1, 2 and 4. Each cylinder contains a piston furnished with a valve for the transfer of air or gaseous mixture from the base, the valve being provided with a fork by which it is operated. It will be observed by reference to Fig. 1 that both the connecting rods of both pistons in the double cylinder engine are received upon the same crank pin. The space in the upper end of the cylinder above the piston is the explosion chamber, with which are connected the inlet and exhaust valves. All the valves used in this engine are of the poppet type, these having been found in actual practice preferable to sliding or rotating valves.

During the up stroke of the piston, following the working stroke, a preliminary charge of air is drawn into the lower part of the working cylinder, from the crank chamber in the base, as the piston rises. At the same time, the upward movement of the piston forces the products of combustion from the explosion chamber through the exhaust valve, which is opened by the slip cam. During the following down stroke the air in the cylinder below the piston is forced upwardly into the working part of the cylinder. At the same time a charge of combustible gas is admitted, and the following up stroke of the piston compresses the explosive mixture in the explosion chamber, forcing it out into the capsule C, Fig. 4, projecting from the inlet valve chest, and this capsule being heated by the burner D ignites the explosive mixture, the expansive power of which forces the piston downward. The ignition of the charge is retarded until the crank is on the dead center by the introduction into the ignition tube of a charge of mixture weaker than that contained in the cylinder. The speed of the engine is controlled by a

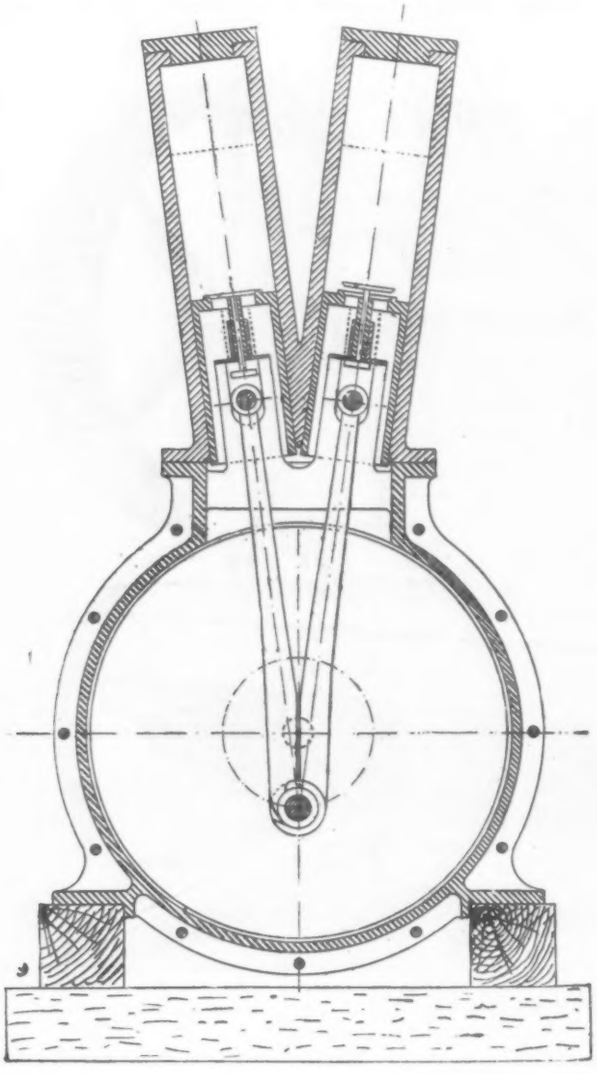


Fig. 1.—Vertical Transverse Section.

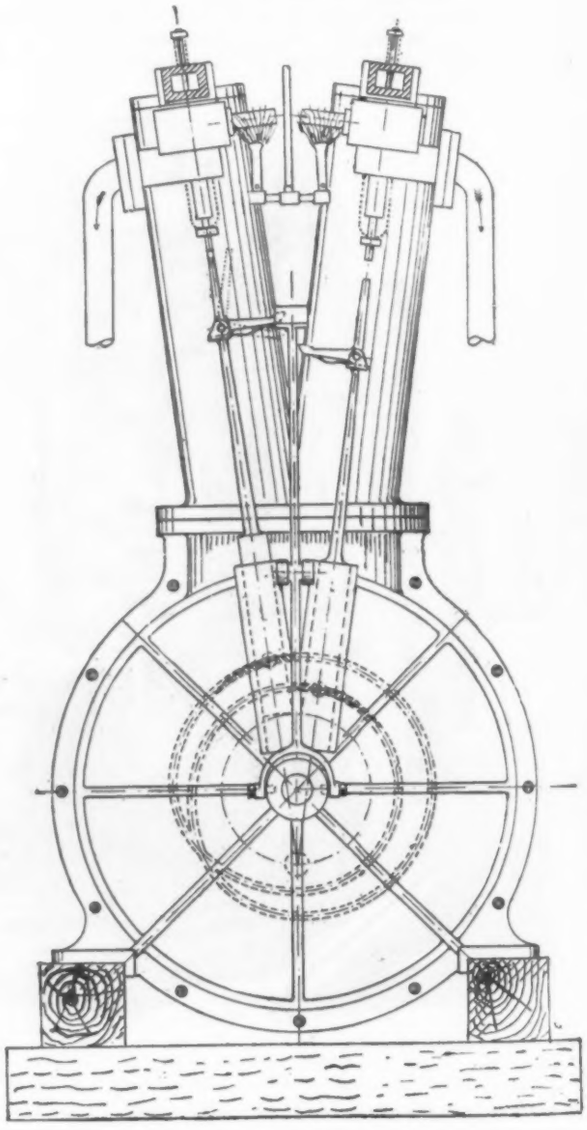


Fig. 2.—Side Elevation of Double Cylinder Motor.

THE DAIMLER GAS AND PETROLEUM MOTOR.

sensitive governor contained in the pulley, and arranged to intermit the admission of the combustible gas when the speed exceeds the normal, the movements of the piston, when no combustible mixture is introduced, resulting in simply compressing and recompressing the air contained by the cylinder.

By the order of operations adopted in this engine the power cylinder is emptied of most of the residual products of combustion and a purer charge of combustible mixture is used than with any other system.

A noticeable feature is the mechanism by which the necessary alternating motion of the valves is secured without the use of gearing. In this engine there is no noticeable noise; in fact, it may safely be called a noiseless engine. The inclosure of the working parts in a casing contributes largely to this result. This construction also insures a rigid base, which is an important item in a gas engine when the power is developed in the cylinder almost instantaneously. Besides this advantage, the chambered base secures in a very simple way the perfect lubrication of all the working parts, at the same time confining the oil so that it is economized to the fullest extent without being scattered about where it is not wanted. The motor is lubricated by a single oil cup, connected with the lower part of the cylinder. The oil received in this manner falls toward the bottom of the casing, and is repeatedly thrown up by the revolving disks.

The explosion chamber is surrounded by a water jacket, and is kept at the proper temperature by a small quantity of water circulating through it, the water being taken from a tank and circulated by gravity in stationary engines, while in portable engines the circulation of the water is effected by means of a pulsometer worked by the exhaust. The motor is started by means of a crank handle on the main shaft, having a clutch which engages the shaft as the crank is turned in the act of starting the engine, and which automatically releases the handle as soon as the engine, after one or two turns, begins to run itself.

Where petroleum is used as fuel the carbureter shown in Fig. 6 is employed. The lower part of the carbureting apparatus consists of a small petroleum tank, H, containing a float, B, which rests upon the petroleum. The float is provided with a central funnel which communicates with the main body of the liquid in the tank through a small opening at the bottom, so that while the liquid is maintained at a constant level in the funnel it is practically isolated from the main body of the petroleum. The float is provided with an air tube entering the funnel and perforated below the surface of the petroleum. This air tube slides freely in a tube, F, attached to the cover of the apparatus and acting as a guide, allowing the float to rise and fall according to the supply of petroleum. Hot air is admitted to the carbureter through the pipe attached to the upper part of the apparatus, the air being heated in its passage to the carbureter by the products of combustion, which pass through a jacket surrounding the air pipe on their way to the open air. The carbureted air passes through the vapor pipe in the direction indicated by the arrow and unites with a stream of air drawn into the motor cylinder through the admission valve G. This valve is provided with a graduated scale which facilitates the adjustment. It has also an automatically operating safety valve. The reservoir H is filled through a supply pipe extending down to the bottom through the air tubes and float. The supply pipe communicates with the lamp font, which furnishes the fuel to the burner which heats the ignition capsule. The time required for heating the capsule and starting the motor is only a minute or so. The motor is stopped temporarily by shutting off the supply of combustible gas, allowing the ignition burner to continue burning, but for a complete stop the ignition burner is extinguished in addition to shutting off the gas.

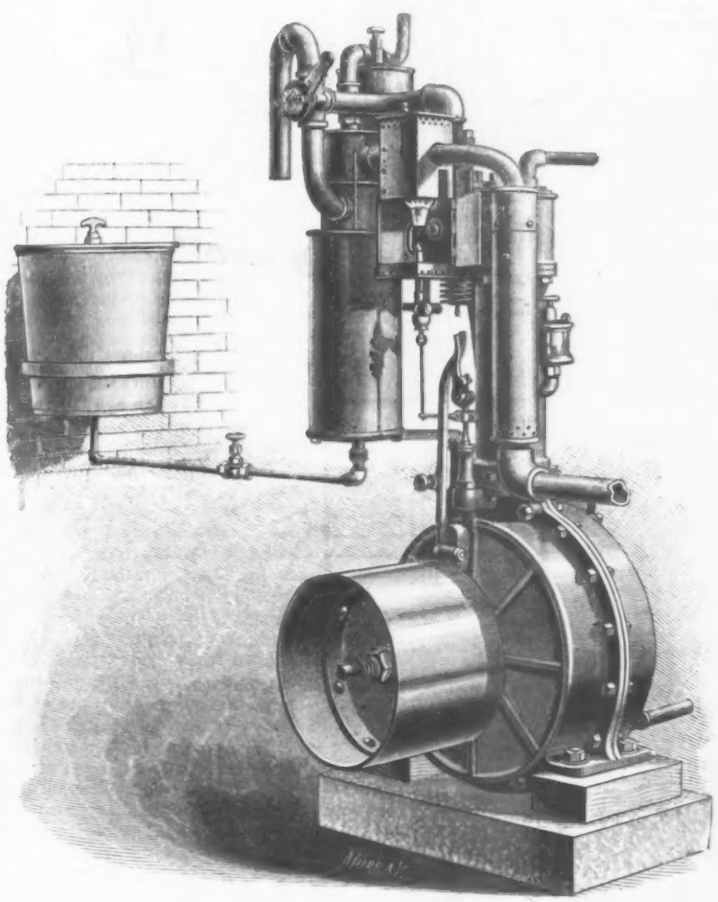


Fig. 3.—View of Single Cylinder Motor.

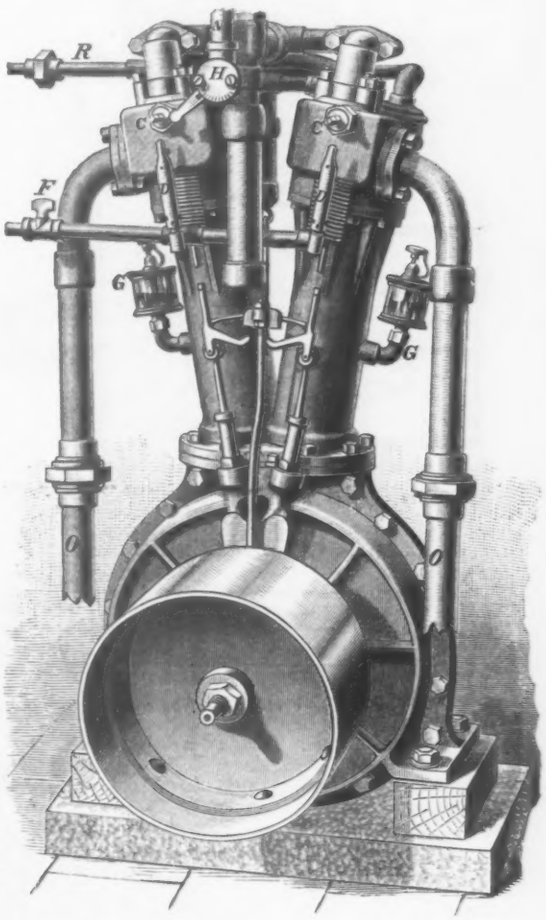


Fig. 4.—View of Double Cylinder Motor.

THE DAIMLER GAS AND PETROLEUM MOTOR.

It will be perceived that as this motor can be readily supplied with fuel and is independent of water supply, it is adapted for use in many places where a steam engine would be out of the question. These considerations and its compact form and the ease with which it can be manipulated render it especially applicable to the propulsion of small boats. For this service it has already found a wide application.

Bergmann & Co., prominent manufacturers of electrical supplies of this city, are reported to be interested in the introduction of a new electric motor.

Bonded warehouses have been established at Greytown, Nicaragua, in which imported goods can be stored without previous payment of duties.

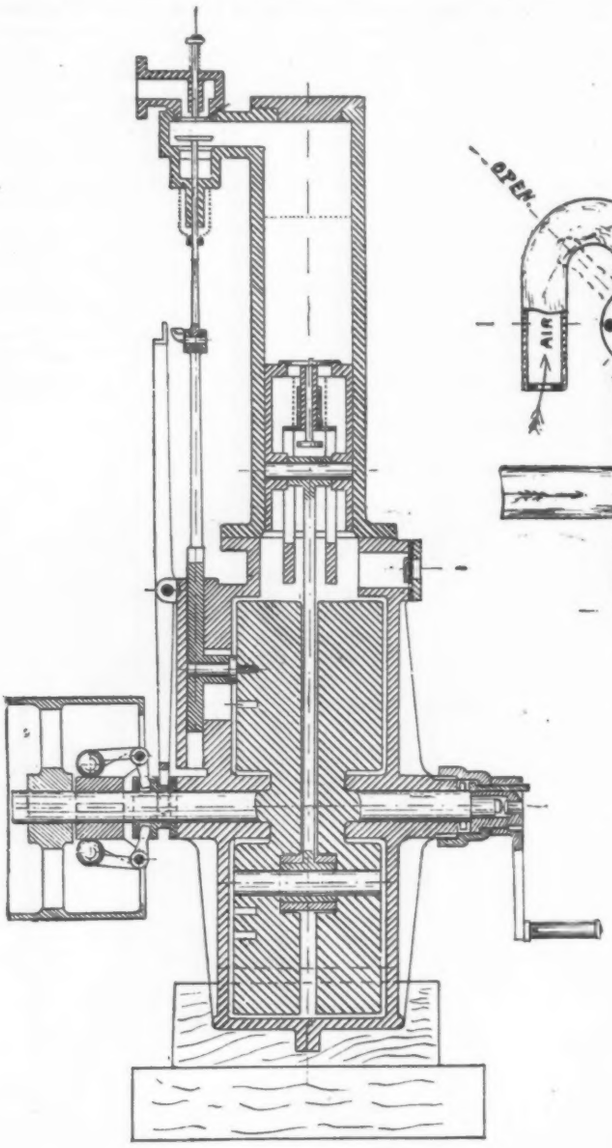


Fig. 5.—Vertical Section on Line of Shaft.

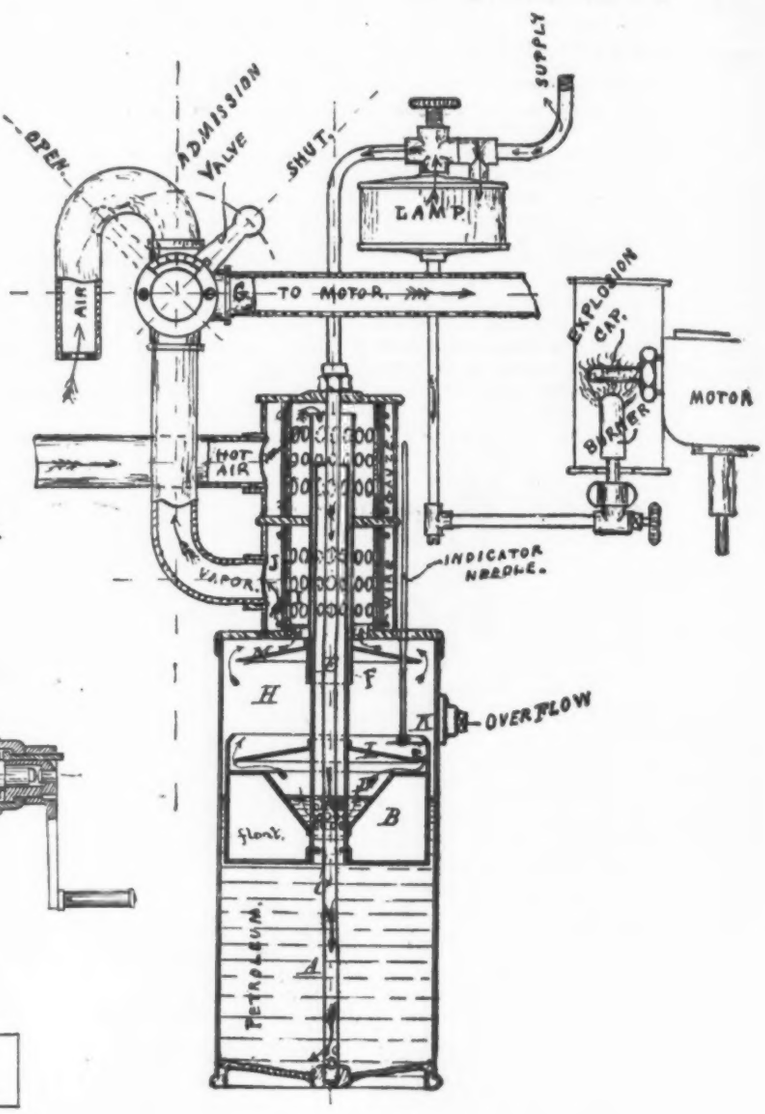


Fig. 6.—Carbureting Apparatus.

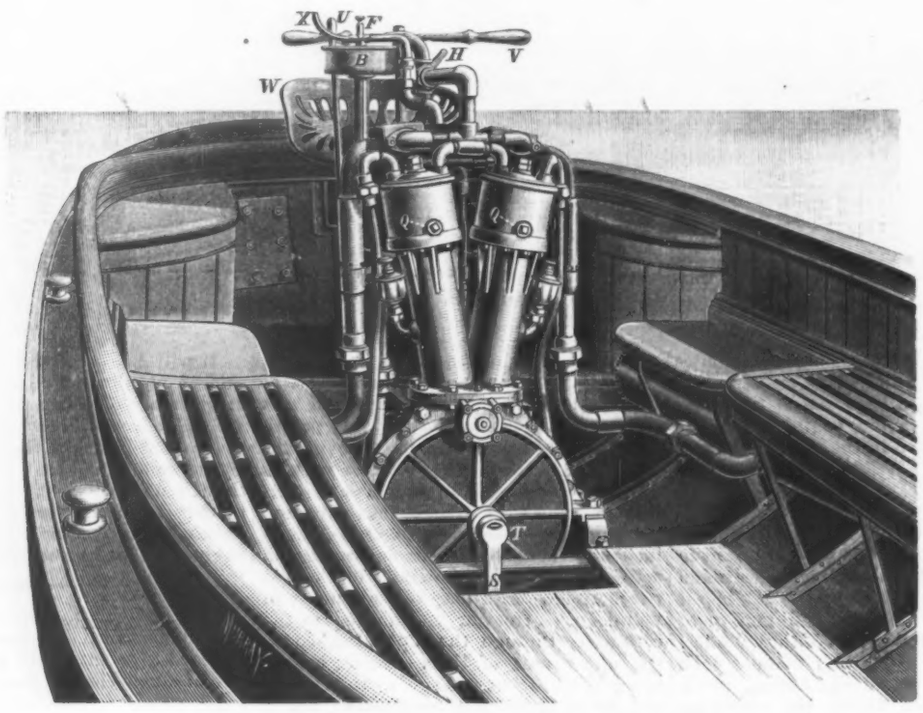


Fig. 7.—The Daimler Motor Applied to Boat Propulsion.

THE DAIMLER GAS AND PETROLEUM MOTOR.

THE MINING ENGINEERS.

PROCEEDINGS OF THE CLEVELAND MEETING.

Although the attendance at the fifty-ninth meeting of the American Institute of Mining Engineers, held at Cleveland, Ohio, last week, was unusually small, it was characterized by features which, if they are persistently brought out, will do much to revive a larger interest in the gatherings of this body. It has been the conviction of a large number of the older members of the institute, among them the present incumbent of the presidency, John Birkinbine of Philadelphia, that discussion and debate must give life to the meetings. An earnest effort was made to bring this about, and it succeeded admirably, the Cleveland sessions having been more animated in this respect than any held for years. The society embraces in its membership engineers interested in so many different branches of the mining and metallurgical professions that very few gather at any one time eager and qualified to speak on the one particular subject brought up. Its magnitude and the diversification of its interests are the chief sources of danger to the continued prosperity of the institute. It is more and more becoming a body which publishes annually a great and brilliant volume. It has been losing steadily its power to attract men of affairs to its gatherings and to promote opportunities for intercourse and the exchange of experience on the part of men interested in the same line of work. There is little inducement to travel hundreds of miles and give up a week's work merely to hear papers read, which may be as well perused at leisure at home. The social features have always been attractive in the institute, so that there must be some other means of overcoming the indifference to attendance which has become so marked a feature when comparing it with the large gatherings of the American Society of Mechanical Engineers.

The iron and steel interest is probably the largest and most influential in the institute. It has been suggested that one of its meetings, to be held annually in one of the large cities, be devoted chiefly to the presentation and discussion of papers on iron and steel. Nearly all the sessions at Cleveland were of this character, and the great majority of the members present were interested in this branch. The result was that the audience closely followed the proceedings and took an active part in them. Among those present were: Fayette Brown, whose record in connection with the rehabilitation of Brown, Bonnell & Co. is so well known, acting as chairman of the local committee; J. K. Bole of the Otis Steel Company, vice-chairman; E. W. Oglebay of Oglebay, Norton & Co., secretary; R. F. Jopling, George Bartol, and L. A. Roby of the Otis Steel Company; Alexander E. Brown of the Brown Hoisting and Conveying Company, Cleveland; Lee Burt of Detroit, George A. Dean, manager of the Mingo Furnaces; J. S. Fackenthal of the Glendon Iron Company, E. L. Ford of the Youngstown Steel Company, John Stevenson, Jr, of the New Castle Wire Company, N. D. Hibbard, metallurgical engineer, of Pittsburgh; T. M. Hopke, Linden Steel Company, Pittsburgh; Julian Kennedy and Hugh Kennedy of Pittsburgh, J. M. Jaycox of the Bellaire Works, Guy R. Johnson, Longdale Iron Company, Longdale, Va.; E. M. Ferguson, Pittsburgh; E. C. Pechin, Virginia Development Company, Roanoke, Va.; W. H. Rea, Robinson Rea Mfg. Company, Pittsburgh; J. Z. Speer, C. E. Stafford, Shoenberger & Co., Pittsburgh; G. C. Gardner, Chicago; Prof. J. W. Langley, Pittsburgh; W. S. Russel, Russel Wheel and Foundry Company, Detroit, Mich.; W. H. Wiley, New York; T. D. Ledyard, Toronto, Ont.; H. C. Spaulding of the Thomson-Houston Electric Company, Lynn, Mass., and J. R. Thomas of the Thomas Furnace Company, Niles, Ohio.

The opening session of the meeting was held at Association Hall, Tuesday, June 2, at 8 o'clock in the evening, and was called to order on behalf of the local committee by Hon. George H. Ely, who presented Mayor W. G. Rose. The Mayor welcomed the members of the institute in a brief address, John Birkinbine of Philadelphia, the president of the institute, responding.

Mr. Ely then turned the chairmanship over to President Birkinbine, who announced that the first business would be the election of the new members. The following names were read, and as there was no objection, the secretary cast a ballot, and they were declared elected: Walter A. Ballard, Pittsburgh; William Kennedy, Austin, Texas; George A. Sonnemann, Idaho; John W. Dougherty, Steelton, Pa; Gerard Partington, Nova Scotia; Frank L. Nason, New Brunswick, N. J.; D. McVitchie, Iron Belt, Wis.; John A. Given, Buena Vista, Va.; Erastus Wiman, Staten Island; Ignacis Bonillas, Sonoro, Mexico; William G. Park, Scranton, Pa.; Ebenezer K. Mitting, Chicago; Robert G. E. Leckie, Londonderry, Nova Scotia; Fred. D. Power, Melbourne, Australia; William H. Parsons, New York; Frank H. Buhl, Sharon, Pa.; James T. Pullen, Mexico; John B. Coryell, Corning, N. Y.; William J. Kerr; Roanoke, Va., and Alexander Sahlin of New York.

Dr. R. W. Raymond of New York, the secretary of the institute, was then introduced, and he delivered an interesting lecture on "Modern Engineering in Egypt."

SECOND DAY.

President Birkinbine called upon A. B. Wood of Detroit, who read a paper entitled "Electricity in Welding and Metal Working," which we shall publish in a later issue.

The next paper was by Prof. J. C. Smock, State Geologist of New Jersey, being a review of

The Iron Industry of New Jersey.

The history of iron mining in New Jersey goes back beyond that of some other districts of the country. The earlier operations, of course, were in a very small way, and the output was correspondingly small. During the first half century of the history of iron mining in that State the production probably did not exceed 10,000 tons per year. That ore was all smelted in the old Catalan forge, and then came the charcoal furnace. The year of the charcoal furnace introduced a demand for larger supplies of ore and a slight increase, but still the production of the iron mines of the State was comparatively small until about 30 years ago. In 1855 Dr. Kitchell, State Geologist, estimated the output to be 100,000 tons. The mines described in his report are many of them still producing, and a few in new localities have been added. At that time there were three iron furnaces using anthracite coal, and the larger part of the ore was used in Pennsylvania.

Passing on to the period of 1860, when we have the first accurate returns through the United States Census, we note the production of 164,900 tons. In 1863 the estimated output, according to the report of Professor Cook, exceded 200,000 tons. In 1868 a complete list of the iron ore producing localities was prepared, and there were at that time 115 separate mines and groups of mines, and their aggregate output amounted to 275,000 tons. The list had further grown to 161 in 1871, nearly all in the northeastern part of New Jersey. About 30 mines and closely located groups of mines yielded nearly all the production of the State, and many of the remaining localities of the list were either new openings or abandoned mines in exploited localities. Beginning with 1870, we have very close estimates and in part accurate returns for each year of the past two decades. The panic of 1873 made itself felt in the iron ore districts, and there was a decline of 20 per cent. In 1875 the production fell to 390,000 tons, and in 1876 to 285,000 tons. Several large producers suspended work in 1877, and all of the smaller companies were obliged to stop work. To-day, of the 325 localities which have been put in the list of iron mines and iron ore localities in the State only 30 are producing. You see what a small proportion, scarcely one-tenth; showing that the production has come steadily from the large mines. Another strange fact is that of these 30 mines nearly all of them were open more than a century ago, some 150 years ago, and from that to 170 years ago. Those old mines have been worked almost continuously. It is curious fact in the history of iron mining in the State that of the mines active to day two only (which might be considered as mines of any size) have been discovered during the last 20 years

E. C. Pechin: A very serious thing in concentrating a good many of the magnetic ores is the exceedingly fine condition in which the resulting product is left. Take, for instance, the Cranberry Mine in North Carolina. There is no question that if that ore is crushed it can be concentrated to be rich in iron. But the concentrate will be a powder, nothing like the concentrates of the Lake Champlain region. Is there any objection to putting that fine stuff in the form of briquettes, assuming that it can be commercially done? Would the fact that it can be compressed into a hard block render it more difficult to reduce in the furnace than if it were simply in the shape of lumps?

The President: I may state that at the Edison Works, at Ogden, they are now crushing their ore in 60 mesh. I do not think any one of us will agree that that is as satisfactory to a blast furnace as 6 mesh. Notwithstanding that, it is reported to me on excellent authority that a sale of 100,000 tons of that concentrate has been made to the Bethlehem Iron Works.

The next paper presented was entitled "The First Iron Blast Furnaces in America," by W. H. Adams of New York City.

In the course of the discussion of this paper E. C. Pechin gave the following analysis of Gossan ore, the sample being taken from eight cars, picked out at random within the last two or three weeks:

Iron	41.74
Silica	19.
Manganese	0.13
Phosphorus	0.13
Sulphur	0.28
Aluminum	2.68
Lime	0.96
Magnesia	3.46
Potash	0.16
Soda	1.79

Our brown ores are highly impregnated with phosphorus and magnesia, and it is impossible for us to get what may be called an extra strong foundry iron. Our forge irons are very good. This Gossan ore seems to have the effect of giving strength to the brown ores, and it looks very much as if it were going to play a very important part. They are now undertaking very careful experiments to see whether or not the sulphur cannot by some cheap process be expelled from the mundic rock on a

commercial scale, and if they succeed in that—why, the quantity is infinite.

The secretary read a paper by James Gayley of the Edgar Thomson Works on

"Blowing In" Large Coke Furnaces.

The practice that has been followed for a number of years at the Edgar Thomson Works, and which gives excellent results, is practically identical with the plan hereinafter described. As a prime requisite to "blowing in," it is essential to have the furnace thoroughly dried; and on this point I would lay great emphasis, as it not only facilitates that operation, but puts the brick work in a better state for preservation and conduces to more economical results during the blast. In many cases it eliminates the tendency to scaffolds, which, when formed at this stage, become practically immovable. The drying out process should be commenced with a very light fire, gradually increased as the brick work becomes warmer to what may be termed hard firing. The furnace should be dried for at least a month, and longer if possible. A statement often made and carried into effect, that "blowing in will dry it out" has resulted in too many cases in loss to the owners. This practice will undoubtedly dry out the furnace, but it is a very expensive way of doing it. In this connection I will cite a case in Eastern Pennsylvania, where rival works had each a furnace under construction and put forth every effort to complete the work first. The successful one in the test, as soon as the last brick was laid and charging arrangement placed in position, immediately commenced filling without removing the scaffolding, and fired as soon as filled. I have every reason to believe that this furnace was eventually dried out, but the evil results of such haste were discernible throughout the entire period of blast.

In placing the wood in the furnace, our practice is to support on posts a platform about 2 feet above the tuyere arch, and under the bottom of each post to place a piece of fire brick on which is a sheet of thick asbestos. The reason for doing this is that the furnace interior being very hot. the scaffold is in danger of igniting before the furnace is filled. We usually start to put in the wood in the morning, stopping the firing the evening before so that the brick work will be partially cooled. Even then the hearth is sometimes so hot that it is necessary to place a plank on some bats for the workmen to stand on. The advantages derived from this are that the wood, being thoroughly dried, and readily ignited, and any excess of moisture being driven off, a quick and easy draft is obtained immediately on lighting—by the natural draft of the furnace alone. After the skeleton parts of the scaffold are in a charge of coke is put in, sufficient to fill the hearth up to the bottom of the cinder-notch opening. This prevents a long drop of the superincumbent material when the scaffold posts are burned away, also the tendency to jamb on the bosh; while its commencing to burn as soon as the blast is fired heats up the hearth and keeps the iron notch in good condition. On the platform planks are placed sufficiently close to prevent the cord wood on end from falling through. Above the platform three lengths of cord wood (hard wood is preferred), are placed on end, with a cribbing in the center to allow space for the workmen to pass up the wood. On top of the wood a blank charge of coke is put in of 250 barrows, or by weight 207,-500 pounds; with this coke there is put in sufficient limestone for fluxing the ash, and in addition a few barrels of spiegel or ferromanganese cinder. Our regular charges consist of 12 barrows of coke, 12 barrows of ore, 6 barrows of stone. The weight of a coke barrow is 830 pounds. The regular coke charge amounts, therefore, to 9960 pounds. With the large blank charge of coke that is put in, the ore round can be started at about the same weight as the unit of coke; consequently we put in the first charges as follows:

No. of charges.	Weight of coke.	Weight of ore.	
10	9,960	9,600	
5	9,960	10,200	Limestone
10	9,960	10,800	to
20	9,960	12,000	suit.
30	9,960	12,600	

and afterward as the condition of the furnace indicates. Of course it only requires a small number of the above charges to fill the furnace. To the first few charges an extra barrow of furnace cinder is often added. The space between the scaffold above and bed of coke beneath is then filled with the kindling wood, and the torch which is to start the slumbering energies into activity is applied, generally by a young lady, whose graces preside as beneficent genii over the destiny of the blast. In addition to lighting the wood at the cinder notch red-hot bars are thrust in at each tuyere to start the combustion uniformly; ordinarily we find very little trouble with the draft, and when properly managed I consider the natural draft of the stack much preferable to the more rapid one obtained by connecting with the chimney. When the scaffold has burned away, allowing the stock to settle gently, and bringing hot coke or charcoal in front of all the tuyeres, the blast is put on. The time from lighting to putting on of blast varies from six to ten hours. The blast is put on slowly at first, and increased hourly until the volume of air is one-half of the normal quantity, at which point it is held until after the first cast of iron is made. In order to avoid explosions in the flues, which frequently happen at the start, the valves in the boiler and stove gas mains are closed, and all of the gas is allowed to escape through the bleeder until after the first cast is made. A practice in frequent use for "blowing in" furnaces is to put in a large quantity of wood with a small blank fuel charge, this being followed by the regular charges, in which the ore weight is about one-half that of the fuel. The result of this practice is that the wood burns away quickly, bringing the ore down to the tuyeres before it has had time to be reduced, making a cold hearth, from which is got a black scorching cinder and white iron. The method that I have described in detail has much to commend it, as the large blank charge of coke used furnishes sufficient gas and solid fuel for complete reduction; and after settling when the wood is burned away maintains the fusion limit at or near the position that would be normal for that volume of air. At the same time the hearth is thoroughly heated, and a good grade of iron is obtained. As a matter of fact, the first cast of iron is No. 1, varying in silicon from 1.75 to 2.50 per cent., and the cinder is identical in color and composition with that obtained when the furnace is in normal working condition. So certain are we of knowing by this practice the quality of the metal that it is run into ladles and sent to the steel works for conversion like the rest of the metal. The description I have given of our practice of "blowing in" is based on a furnace of 19,000 cubic feet capacity.

In the discussion, G. R. Johnson of Longdale, Va., said: We rebuilt a furnace, and the time consumed was about two months. The result was that while the furnace started very quietly and without any scaffolding it was six months before it carried the proper burden. It was dried for two weeks before we put the blast on. The great mass of brick work was undoubtedly still filled with moisture, and the result was that we had a very poor blast, only about two-thirds burden being carried, and the iron being very unsatisfactory. An incident of the starting of that blast was that instead of beginning on Saturday, as had been intended, we waited until Monday morning, but on Sunday there came a very heavy rain. We did not have any stock yard; we kept all our material out of doors, and everything was wet except the wood. We thought, perhaps, we might dry out the material a little by blowing a hot blast in after the furnace was filled. We got it a little too hot and the wood kindled, and we started the furnace with a hot blast. Fortunately, we had no evil results.

Julian Kennedy reported his experience as follows: In blowing in our furnaces we very seldom put in more wood than went around the tuyeres. We put in a large amount of coke—probably 20 rounds, 4000 pounds per round. We put in some lime, going up when the furnace is filled to about even quantities of ore and coke. We bend a pipe up at the end and screw a back on top of it, and before lighting it we pour a bucket of oil into each tuyere. Then we put on a light blast and light that tuyere and keep the blast right on the furnace. In that way the fire is distributed equally through the wood, and the coke comes down to the tuyeres pretty soon. Then we bring our gas down to our stove and boilers, as we have found that with a large amount of wood put in the bottom of the furnace, leaving the top of the furnace open and putting on the blast leads to so much settling and leaves a space in the top of our furnace. This is apt to make a bad explosion, and we think it preferable to put in a small amount of wood and leave little chance for settling. We have dried out for two weeks and for three months, and ordinarily we have seen very little difference in the working of the furnace provided we gave enough coke in our charge not to bring our ore down our tuyeres too quickly.

The President: That is quite different from the older practice in the original old fashioned charcoal furnace, where they first filled the furnace and lit it on top and when the fire got down to the tuyeres they filled it up again and then put the blast on. I remember some years ago visiting one of these furnaces. The proprietor was ill at his house. In reply to my question "I see you are putting your furnace in blast?" he replied "yes." "You still light on the top," I remarked. "Yes, but yesterday I thought she was not going fast enough and I went out and fired at the bottom too."

E. C. Pechin remarked: I am inclined to think that with our Pocahontas coke, which is a very much softer material, dropping the coke into the furnace might be accompanied with a little risk. I should think the best practice would be to lower your blank charges. In our practice we put on the light blast first before we fire up, and then just as soon as the gas will ignite freely shut the bell.

George A. Dean: There is a question that I would like to hear discussed as to the action of a furnace standing after having been relined for any length of time before being fired, whether it is objectionable or not. The reason why I ask it is that I had an experience myself with a furnace that we had lined up that stood about seven months. We kept it warm by putting the gas into it from the furnace in operation, and we found that we only had about half a product from the furnace. The question is whether the gas from the other furnace had in any way affected the brick work of the original lining in this furnace.

Hugh Kennedy: I think if a furnace stands where it is exposed to the rain, and the latter gets down between the lining and the casing, it is very apt to make a short blast. I think we should blow it in

hot. It is better to be too hot than to get too cold. My plan is always to put in a ring of one layer of wood above the tuyeres a foot thick. Then, as Mr. Gayley says, put in a charge of coke, and then with pretty heavy charges in that way you get a good hot fire. B Furnace of the Edgar Thomson works was the first on which the blast was put before lighting. The practice of leaving the bell open after the blast is on is a bad one. I think that as soon as the blast has been on for a couple of hours and the gas is in shape so that it lights easily the bell should be closed. My experience has been if fire brick are frozen you cannot expect any good work in the furnace. We had a lining put in probably two years ago. We had not room in our brick shed, and we piled it up, and roofed it in carefully to keep it dry. A flood in November caused the water to rise 6 or 8 inches on the brick, which were frozen in the ice all winter. We concluded to put in the lining just as it was and run the risk. It made 166,000 tons, but when we came to blow it out we found holes in it where the brick work was all gone, showing that the freezing of the brick had destroyed them and made them disintegrate under heat.

E. C. Pechin: The matter to which we pay most attention in our specifications in building a blast furnace is that every fire brick that is to be used in the furnace must come under cover and be kept under cover at all hazards. In Virginia they have had very serious trouble by reason of the giving way of the in-walls immediately under the bell. Crozer No. 2, built last year, only ran about six or eight months when the whole of the lining under the bell gave away, and the lining followed right down, and they had to shovel out. The bricks were absolutely disintegrated. I think unquestionably that disintegration took place by the enormous amount of hot steam that was generated in the first 10 feet. They had put in No. 2 Mount Savage brick, which I think is bad practice on that part of the furnace. I have strongly recommended in our Virginia furnace the putting in at the upper 15 feet of the furnace as near a vitrified brick as you can get.

The President: We find in the Cornwall furnaces that they have had trouble in the top of the furnace, which seems to be due to the disintegration of the brick, credited to the action of sulphur at a high temperature.

The evening session opened with the reading by the president of

Memoranda of Operation of the Emma Furnace,

which is operated by the Logan Iron and Steel Company, Logan, Pa. The report is signed by R W. Lee, Jr. The Emma blast furnace is an old structure which has been raised, its dimensions being as follows:

Total hight, 52 feet.
Diameter at top of bosh, 9 feet.
Diameter of hearth, 5 feet.
Diameter at stock line, 7 feet.
Hight of tuyeres above bottom, 5 feet.
Total cubic capacity of furnace, 1449 cubic feet.
Cubic capacity to stock line, 1303 cubic feet.

The furnace is blown by one vertical Weimer engine, with 14 inch steam cylinder, 48-inch air cylinder, stroke 2 feet, running at an average speed of 80 revolutions per minute; and this engine has been in use since July, 1881, running continuously at from 70 to 90 revolutions per minute, the only repairs being required were the insertion of some new rubber blowing valves and renewal of crank-pin brasses. The air is heated in one Durham stove to 800° F. The furnace is running on an ore mixture of soft fossil and roasted carbonate ores from the company's mines, mill cinder and some Lake Superior red hematite. The mixtures vary according to the uses to which the iron is to be put, the percentage of the ore mixture running from 57 per cent. to 43 per cent., the average being 47 per cent. During the present campaign, which commenced on June 12, 1890, the furnace has averaged, without making any allowance for stops, 24.2 gross tons per day, the maximum total output, which has been repeated a number of times, being 30 gross tons.

The operation of the furnace showed a consumption of 2900 pounds of coke per ton of iron; the ores charged averaged 4873 pounds per ton of iron made, and in addition, 2561 pounds of limestone were charged. This is equivalent to 2.56 pounds of ore and flux per pound of fuel, and it is proper here to state that, owing to the fuel charged being with a percentage allowance for loss, the furnace bin shows a material stock on hand which does not exist on the books, and, therefore, the actual fuel consumption is somewhat less than above, and the amount of material carried per pound of fuel correspondingly greater. When running at 30 tons per day, 1 ton of iron was made in 24 hours for every 43.4 cubic feet, of furnace capacity, and when running at the average of 24.2 tons per day, 1 ton of iron was made for every 53.8 cubic feet.

Hattie Ensley.

The Hattie Ensley Furnace is reported on by Edward Doud. The Hattie Furnace is one of the two furnaces of Sheffield, Ala., owned by the Lady Ensley Coal, Iron and Railroad Company. It has the following general dimensions:

Total hight, 75 feet.
Hight of tuyere line, 5 feet 6 inches.
Hight of bosh, 35 feet.
Diameter of hearth, 9 feet.
Diameter of bosh, 17 feet.
Diameter of stock line, 12 feet 4 inches.
Diameter of bill, 8 feet 6 inches.
Cubical capacity, 9140 feet.
Number of tuyeres, eight, with 6-inch nozzles.
Volume of blast about 1400 cubic feet per minute.
Temperature of blast about 1100° F.
Pressure of blast about 5 pounds.

The average make of iron for six months ending March 30, 1891, was 146 tons (of 2300 pounds) per day. Average consumption of coke per ton of iron made 2451 pounds. Average yield of ore, 48½ per cent. Ore used was native brown hematite. Coke used was Pocahontas Flat Top. Limestone used was Darlington oolithic stone, containing 98 per cent. of carbonates, and strictly uniform.

Tabulating this information and comparing it with the best work reported by Mr. Gayley in his admirable paper read to the last American meeting of the Iron and Steel Institute, on the development of American blast furnaces, with special reference to large yields, we will compare with the furnace doing the best work and described in his paper as Fig. 8.

	Fig. 8 of Mr. Gayley's paper.	Hattie Ensley Furnace.
Cubical capacity	18,200	9,140
Volume of air per minute	25,000	14,000
Temperature of blast	1,100	1,100
Pressure of blast, lbs.	9½	5
Number of tuyeres	7	8
Size of tuyeres, inches	6	6
Average daily output	310	146
Average coke consumption	1,920	2,451
Furnace capacity for 1 ton of iron	59	68
Average yield of ores, per cent	62	48½

To arrive at a fair comparison we must take into account the difference in size of the two furnaces and the difference in the yield of the ores.

Bringing the Hattie up to the same size as Mr. Gayley's furnace Fig. 8, and ore up the yield of his own, we have the following table, showing more nearly a true comparison:

	Fig. 8 of Mr. Gayley's paper.	Hattie, bro't to size and ore of Fig. 8.
Cubical capacity	18,200	18,200
Volume of air per minute	25,000	28,000
Temperature of blast	1,100	1,100
Pressure of blast, lbs.	9½	5
Number of tuyeres	7	8
Size of tuyeres, inches	6	6
Average daily output	310	371½
Average coke consumption	1,920	1,917
Furnace capacity for 1 ton of iron	59	49
Average yield of ores, per cent	62	62

It will be seen that the small furnace is producing at a higher rate than the large one when compensations are taken into account, and on as low a consumption of fuel, notwithstanding that the small furnace, by reason of having more tuyeres and as many coolers, suffers a loss of almost double the amount of heat per ton of iron made in the tuyere and cooler water and by radiation.

Antrim Furnace.

The following details are given on the charcoal furnace of the Antrim Iron Company of Mancelona, Mich.: Blast No. 2 we blew in on the 1st of June. The first year we ran 340 days; product, 16,152 tons. Second year, 352 days; product, 16,368 tons. Third year, 361 days; product, 19,561 tons. Fourth year, 340 days; product, 22,412 tons. Fifth year, 345 days; product, 25,563 tons Eight months of the last year No. 1 stack was in blast; product, 15,062 tons. Total, 40,625 tons for fifth year. The first blast of the original stack covered a period of 22 months; product, 30,282 tons. Today the only parts of the original purchase left consist of the engine and oven. All the buildings have been removed and replaced and added to with brick and iron. Two new engines, 30 x 48 x 72, No. 1 and No. 2 stacks, three ovens, 11 boilers, new hoisting engine, angle iron tower, iron gallery and platforms, four pumps, 93 kilns, office, store, dwellings, warehouses, shops, stables, &c.

From the date of the purchase, March 5, 1886, to the present time, the property has been idle 148 days. Total product to date, 115,118 tons.

Antrim Stack No. 1.—General Dimensions.

Total hight, 48 feet.
Diameter of bosh, 10 feet.
Diameter of crucible, 5 feet 6 inches.
Diameter of tunnel head, 7 feet.
Diameter of stock line, 8 feet 6 inches.
Gross cubical contents, 2415 cubic feet.
Net cubical contents, 2176 cubic feet.
Six tuyeres, diameter, 4 inches.

Performance Blast No. 1, April 14, 1883, to April 22, 1891.

Total number of days in blast, 1103.
Days in actual operation, 1057.
Small Weimer engine (16 x 30 x 48) in service, 582 days.
Product, 32,326 tons.
Daily average, 56 tons.
Large Weimer engine (28 x 48 72) in service, 475 days.
Product, 45,384 tons.
Daily average, 73 tons.
Total product of blast, 66,910 tons.
Daily average, 63 tons.
Charcoal used, 6,311,700 bushels.
Charcoal per ton of iron, 103 bushels.
Ore used, 116,380 tons.
Average yield in furnace, 57½ per cent.
Average burden per charge, 1340 pounds.
Pounds of ore per pound of coal, 2.07.
Air discharge per rev'n, small engine, 62 cu. ft.
Av'ge rev'ns per min., small engine, 75.
Air discharge per revolution, large engine, 226 cubic feet.
Average rev'ns per min., large engine, 35.
Largest day's product, 93 tons.
Largest week's product, 580 tons.
Largest month's product, 2410 tons.

Fayette Brown: We have two furnaces, the oldest furnace and the smallest furnace in the State. One is 55 feet high, 12½-foot bosh. The other is 14-foot bosh and 60 feet high. They are old fashioned shells, very small at the top—very little room in the shell. Each of them has two small iron stoves. The small one runs frequently 100 and sometimes 110 gross tons a day—generally about 90 tons. The other one runs from 110 to 138 tons. I think the two furnaces have made about 70,000 tons of iron in the year ending July 1. The consumption of coke is larger, of course, than it is in some of these large furnaces, for the reason that we use a great deal of lime—some of the time as much as 1600 pounds of lime. Our coke runs up then to about 2600 pounds to the ton. When we use iron ore we get the coke down to about 2300 pounds. The furnaces are old fashioned. One of them has only one engine, 84 inches x 4 feet stroke. The other has an engine of a small size. The furnaces are anything but models, but they have done good work.

Hugh Kennedy: The Ashtabula Furnace No. 2 was in blast four years and ten months on mill iron continuously with never less than 25 per cent. loss of cinder, working coke with 15 per cent. ash, and made in four years and ten months 298,000 tons gross, with 2350 pounds of coke to the ton—18-foot furnace, 14-foot top and 11-foot hearth.

G. R. Johnson, Longdale, Va.: The immense furnaces that we hear about seem to overwhelm our little furnace. We make only about 100 tons a day in two furnaces, one of them 14 feet and the other 16 feet in diameter, and each about 60 feet high and 10-foot tops. Our No. 2 furnace is rather better than the other one. It is making 55 to 60 tons a day, with a consumption of 1900 pounds per gross ton of coke. Our tons are 2280 pounds, making a little allowance for sandage. We have done a great deal better than that in times past. As long ago as 1879 there was one year when we ran a whole year with a small furnace 11 feet in diameter and 8-foot top, where the year's work was about a ton of coke to a ton of iron; but for some reason we are not able to do that any more. The ore now is about 45—average 47. Of course the additional 2 per cent. of ore helped very much.

Lee Burt: For the benefit of some gentlemen in the charcoal iron business I will make a statement, simply as a director of the Union Iron Furnace in Detroit, that during the last year's run we have made an average run of 87½ bushels of coal (1750 pounds) per ton, averaging about 30 to 33 tons per day, based on an average of charcoal per cord of wood of about 49 bushels. It is a small furnace, built in 1872, and her lines have never been changed since 1879. The other data I have not in mind.

Julian Kennedy: I would like to have a little information from some of our mathematical friends with reference to making comparison with furnaces of different sizes with different ores. My experience has been that on a 58 per cent. mixture I could always get a better yield than on a higher mixture. Some ores will give a better yield than other ores which carry no lime. I have always been laboring under the impression also that a furnace of 9000 cubic feet capacity would make more than half the iron that one of 18,000 cubic feet capacity would.

R. W. Raymond: As far as our experience in various lines is concerned in the Durham Furnace—and I suppose on this point an anthracite furnace may be as good a source of information as a coke furnace—we find, 1, that you cannot make comparisons based upon percentage of iron yielded by the ore. Of course it is altogether an essential matter what else is in the ore besides the ore which yields the iron. If it be a self fluxing ore, or if it be an ore which carries so much iron that it can flux other ores, then one element has got to be the weight of burden, and to make the capacity of carbon duty, as John M. Hartman used to call it, of the fuel consumed in your furnace, you must take into consideration the nature of your burden, both the amount of the slag that you make, the heat-absorbing capacity of that created for fusion, and so you get a much more complicated comparison. 2, as to differences directly calculated from cubic capacity, I hold that Mr. Kennedy is perfectly right there. I fancy that very few of us have ever figured exactly how much reducing space is necessary in a furnace. I have never found in my observations—certainly not in practice—an American blast furnace which had so little reducing capacity that the ores did not get reduced before they got to the tuyeres. This is emphatically the case with the red hematites of Lake Superior and brown hematites generally, but we have never found it to be the case in our Jersey magnetites. We have never had any indication, for instance, at the Durham Furnace, that there was any danger at all that the ore would get down to the smelting zone before it was reduced. I fancy we have considerable excess of reducing space, even if we run it at double the rapidity it was originally built to run at. If that is the case you will easily see that the effective part of the furnace ought to be really calculated by subtracting the reducing space of the upper part of the furnace, and if you have a small furnace with an unknown excess of reducing space above and you double the cubic capacity of that furnace, you do not know whether you have got in your new furnace a proportional greater excess of reducing space; you have simply got an unknown excess in one case, and you double the unknown quantity in the other case, and you will compare in one case the smaller unit of capacity—you will compare a furnace the unknown part of which is not doing the work of making your iron with another unknown furnace, and therefore you will get no result with simply comparing the cubic capacity of the two furnaces. The whole cubic space is not necessarily required to reduce the ore and melt the pig iron. If that is the case then you have got no unit there to multiply to get a big furnace with the expectation that you will get a proportional increase of product, because the unit you start with is partly superfluous. I think, therefore, that in point of fact the mere doubling of the aggregate capacity of the interior of the furnace is a very crude and unsatisfactory way of doubling its capacity for making iron. You want to know what part of the smaller furnace which you are thus increasing in comparison was really engaged in making iron. Then if you increase that and adjust the remaining dimensions of the furnace to that you can have at least a test as to whether increased capacity means a relative proportional increase of the product. Then there comes another question—the limit to which we can increase (no matter what the capacity of the furnace is) the product of the iron by giving the necessary increase in the quantity of air. We cannot blow in indefinitely in an anthracite furnace. After you give it a certain amount of air it will burn no more in a given unit of time in that particular air. Putting in more air is merely putting heat where you don't want to have it. That is the reason why all through the anthracite region the furnaces have adopted the process of using a certain percentage of coke. The percentage is now running from 20 to 25. Our real reason for doing it is not because coke is a purer fuel, but is because it will take more air and give the heat then and there, and anthracite will not. After blowing a certain maximum we have reached the limit to which we can drive the furnace with a hot blast on anthracite, and we relatively chill the hearth if we blow any further. We can go further if a portion of that charge is porous coke. Now, all these elements enter into the calculation of the relative capacity and product of furnaces, and I very heartily second what I suppose to be the underlying thought of Mr. Kennedy's remark. He asked a question, and I think I will be bolder and make it an expression of my opinion that I do not think the comparison that Mr. Doud made is a particularly valuable or reliable argument. Perhaps the answer might be that if that is the case we cannot make any comparison, and I accept that criticism.

A member: Is it not true that the smaller coal, say egg size, is much better than anything larger—that is, arguing upon the same theory that the coke is porous and has a large surface immediately exposed to the air, and from the statement that the anthracite will only receive so much air at a time; if you break up that lump you have quadrupled the surface. I know in one furnace that increased the output nearly 50 per cent. using small coal, and breaking up the limestone in equal proportion.

Dr. R. W. Raymond: I would like to state two things from practical experience. First, in such experiments as I have been able to make during the running of these furnaces, I am inclined to think the coal was pretty small when it got down into the zone of the tuyeres to burn. Any coal that passed below the tuyeres and did not get burned was usually no bigger than the end of my little finger, and filled the bottom of the hearth. I suppose that is universal in anthracite furnaces, that the hearth of these furnaces usually below the tuyeres is not by any means a pure bath of metallic iron. On the contrary, any little coal that gets below there is almost a completely indestructible object and is worn out or blown out. Sometimes a great quantity of small bits of coal there will blow out. I am very much inclined to think that these big lumps of coal do not come down to the tuyeres to be burned as big lumps. The second practical point is that we get that nut coal cheaper than the smaller coal. The furnaces are supplied from the anthracite mines with the lump coal which has never been through the breaker and has not had any extra cost put upon it to prepare it. It comes to us cheaper than we can buy the smaller sizes. We have never used smaller sizes except in some exigency, when we have used steamboat coal, which is just as good as the other, only it costs more. Then as far as its taking more air is concerned, that is one very practical question. We are all sometimes troubled with high pressures. We are blowing a great many more pounds with our engines at all the American furnaces than used to be considered at all possible, and our English friends were amazed to see the high pressures that we were blowing. We are all blowing 6 and 7 and 8 pounds regularly. But the question as to the increased pressure of blast required to force the air through such fine material is a pretty serious question when our margin of pressure is small any how. We may have to blow up to the limit for other reasons, but that is the only reason I know of. We are taking in a great deal more fine stuff than we used to do. There is a very large percentage of fine ore used in the Durham Furnace, and all through our part of the country our blast furnace managers are nerving themselves to use not merely the amount of fine ore that we make in handling our own ores, but also other fine ores, concentrates sometimes, and sometimes ores like those of the Bel-

CHICAGO PRICES OF

COMMON BAR IRON, OLD IRON RAILS AND WROUGHT SCRAP.

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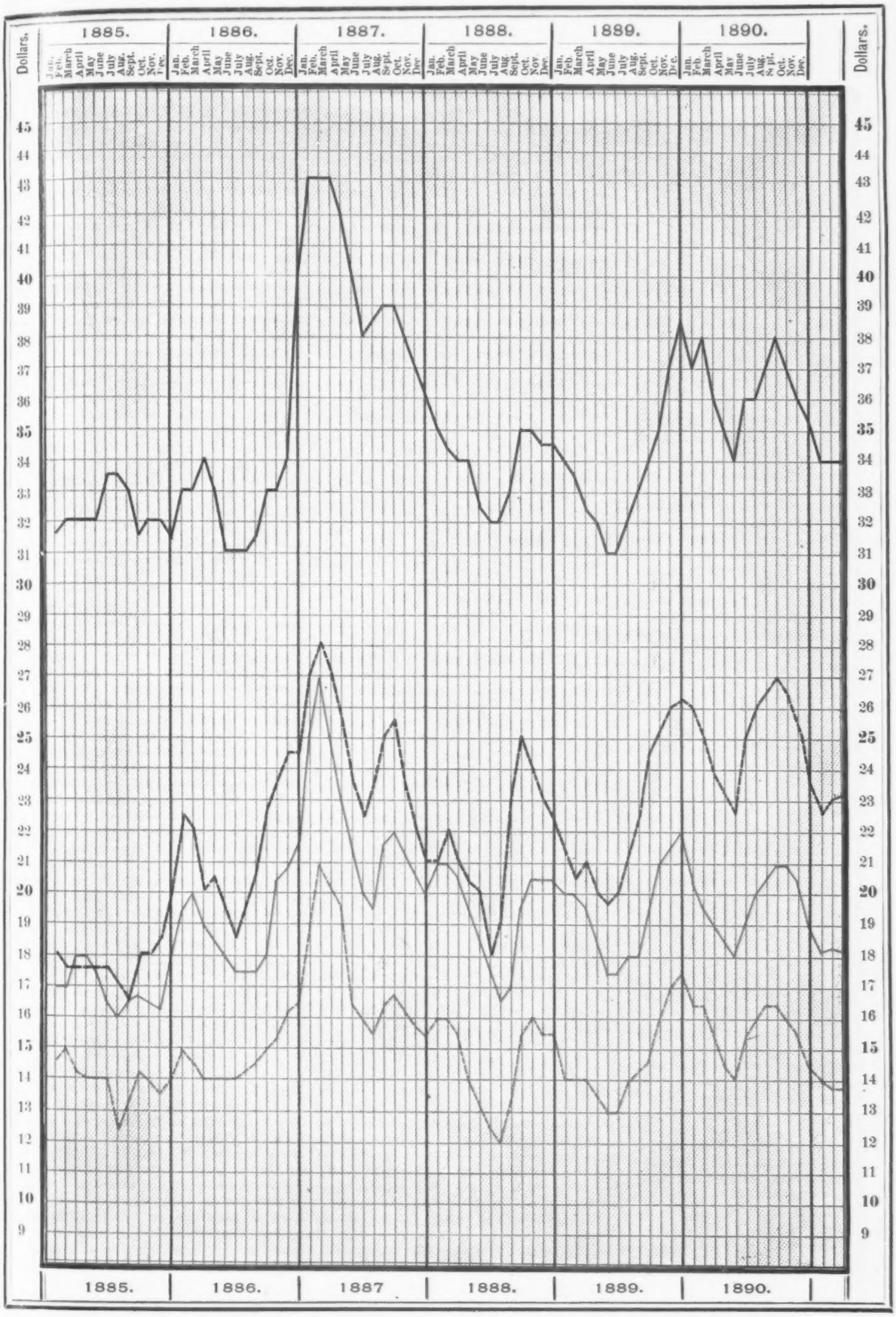

COMMON BAR IRON, Per Net Ton, f.o.b. Chicago (FULL BLUE LINE).
OLD IRON RAILS, Per Gross Ton, " " (DOTTED BLUE LINE).
No. 1. FORGE SCRAP. Per Net Ton, " " (FULL RED LINE).
No. 1. MILL SCRAP, Per Net Ton, " " (DOTTED RED LINE).

videre in New Jersey, which come to us very rich and almost like sand, of course.

Alexander Brown: Is it not a fact that the amount of ore taken into the furnace is an inverse ratio to the surface exposed of the fuel? So far as I have been able to get from statistics it is almost from ratio to the surface exposed—the amount of air used per ton of iron. Take charcoal, which has by far the largest exposure of available carbon, it takes the least of all furnaces in ore per ton of iron, and coke next, and anthracite stands the greatest in the use of air, and the coarser the coal the larger the volume of air required. If the pressure is retained by the fineness of the coal it is retained to burn, not to go through. It is in the furnace long enough to be utilized unless air goes through.

The President: I think Mr. Brown's original statement was eminently correct, that the smaller the coal the better work you would get out of a blast furnace. My reason for saying that is that just prior to the Reading Coal and Iron Company going into the hands of a receiver I was directed by Mr. Gowan to make some examinations and experiments as to the possibility of the further extension of the use of anthracite coal alone in the manufacture of pig iron. In doing that I found that in every case where a blast furnace along the Schuylkill Valley had been forced by reason of strikes, when they could not get lump coal, to go on to the finer grades, theymade more iron in the same length of time and with less consumption of fuel. The only way I know to compare the work of two blast furnaces is, the amount of ore and flux carried per pound of fuel and the amount of air consumed per pound of fuel burned. You will find that runs down to very small figures in these furnaces that are doing good work.

George R. Dean: The furnaces that we operated first were 15 feet in diameter and 60 feet high. At that time we made 80 tons of iron a day. We afterward changed our furnaces to 17 feet diameter and 75 feet high, which is about 50 per cent. more cubical contents, and we made 135 tons. It seemed to have kept up the ratio. The difference that we found in the furnaces was that under the same management, on the same ores, assuming that the furnace would operate the same, we used 2800 pounds of coke on the 15 x 60 furnace and 2400 pounds of coke on the 17 x 75 furnace. By getting the increased heat we found that we were able to make 200 tons a day on 1900 pounds of coke with a temperature of 1300. Our experience seems to prove that we have increased our product in proportion to the number of feet in the furnace.

E. C. Pechin: In endeavoring to compare the work of different furnaces you must take one thing into very careful consideration—not altogether the percentage of iron in your ores, but the shape in which that percentage exists. Now, Mr. Kennedy will recollect last fall in New York when our English friends were making such a Herculean attempt to try to show that we ought not to get such big yields out of our furnaces as we did, and that there was no reason why we should get such big yields, I asked him this question: Whether or not the physical condition of the ore had not a great deal to do with the large yield. I asked Sir I. Lowthian Bell that question before, but he was not disposed to concede anything, and he said that he did not think it made any difference at all. Mr. Kennedy, however, told me that if in place of the Lake Superior hematites a hard specular hematite of Lake Superior is used the yield is not anything like so large. If in place of the hard hematites of Lake Superior we should put on the magnetic ores of Lake Champlain or New Jersey we would find a very marked difference. In Bell's book he makes a special point as to the rapidity of reduction taking place in the furnace owing to the different physical conditions of the ores—that the Cumberland hematities reduced in a given time; the Cleveland stone took much longer; the specular ore took a very long time.

The president then called upon Alexander Brown of Cleveland for a paper on

The Handling in Large Quantities of Ore and Fuel by Mechanical Means.

Between 1878 and 1880 the increase of the output of the mines was felt most from the beginning of the Lake Superior mining, and then it was called to the attention of all the ore handlers and furnacemen that something must be done to facilitate not only the handling, but the storing for gradual use during the winter of the piles that were handled in seven months on the lakes. This meant three things: 1, a vessel tonnage adequate to the output; 2, facilities for loading the vessels promptly, so that they could make the required number of trips to handle the ore in seven months; and, 3, facilities for unloading the vessels without delay.

The original designs for the loading of ores on to vessels at the upper lake ports were as good as they ever could have been, probably, had they been designed now by the most skilled engineers, and it is to the great credit of the original designer of the ore pockets and the ore shutes that they were so perfectly designed at the start that today there is scarcely a thing changed in their construction, except in the details of the spouts to suit the present sizes of vessels, the pockets themselves being much higher to suit the larger tonnage vessels. But, strange to say, the other end of the transportation line was not taken care of as well. In 1880 nine-tenths of all the material handled from the vessels to the docks was either handled by horse-power or steam power, lifting small buckets from the hold of the vessel, dumping them into wheelbarrows, which were wheeled out over the dock and dumped on to piles or on to the cars. This, of course, originated what was then called—and what is now extinct—skilled labor in the matter of wheeling. There were a certain number of men in this city styled "wheelers," and their numbers could not be increased probably ten in two weeks, and then not without permission of the others remaining. From that circumstance it is very clear that either the mines had to gauge their development by the amount of this skilled muscle, or something else had to be done. Then there were a number of attempts made at various modifications of swinging cranes that would handle the ore. Then from that the demand required that larger storage facilities should be had and a less costly mode of handling be inaugurated, and that necessitated the reconsideration of the entire problem how to take care of the ore in unloading, and also to give increased capacity on the then limited frontage of the dock, as well as the rehandling of ore from that storage place to the cars. The idea was developed of spanning the dock with either a tramway or a bridge, but there were so many difficulties of a mechanical nature that came up that that was abandoned. If several feet of ore were filled in depth on the docks they sank down several feet under the increase of the load and come up in the river.

In 1880 there was one set of machinery on the whole line of lakes that attempted to handle ore and store it back over 70 feet from the front of the dock direct from the vessel. The first set of machinery put up in 1880 carried it back to the depth of the dock, and that quadrupled the same area in capacity for storage. As late as 1884 the cost was something between 40 and 45 cents a ton; that is, taking the ore from the vessel, putting it on the dock, and reloading it in the cars. The men were receiving in 1880 22 cents for the first 100 feet out of the boat. The gang, as regulated by the skilled engineers, of wheelers was 18. There were three buckets holding about 600 pounds each, one to each hatch, and there were three men in each hatch, and three weighers on top of each hatch. That made a gang of 18, and they were paid this full price per ton. Then if the ore was wheeled back further than 100 feet from the center of the boat an additional wheeler was put on for every additional 50 feet, and this additional wheeler got the same per ton as would have been paid if only 18 men were employed. So that by the time the ore got out 100 or 200 feet the cost of handling the ore was considerable. It amounted to 35 cents a ton oftentimes simply to get it on the dock. The difference between the actual getting of the ore out of the vessels and on to the cars or on the dock was the difference between 22 and 35 or 40. That would represent the amount paid for wheeling it out beyond the first 50 feet. That would be about 13 cents to 18 cents, the average paid for wheeling out—the mere getting of it from the vessel to the dock. To-day the average cost never exceeds 1½ cents a ton to take it from the vessel and dump it anywhere within 300 or 400 feet, or lower it into cars, including all costs. We have in many cases gone as low as $\frac{7}{10}$ cent a ton. If the machinery is operated so that the fixed charges of the engineers and the operators are divided over a larger tonnage, or, if they are kept constantly busy, the cost per ton will run down as low as $\frac{7}{10}$ cent a ton, including everything. The balance of the cost of unloading is the mere shoveling in the hold of the vessel. It may be imagined what control the men have on the ports of Lake Erie when it is stated that the average daily earnings of a good shoveler on the lakes, using the machinery, is anywhere from $6 to $10 a day. And yet the men are striking to-day because they are threatened with a reduction of 1 cent a ton for shoveling—from 13 cents a ton to 12 cents. Last year it was 11 cents at Ashtabula and Fairport and 13 cents in Cleveland. This year they are trying to make it 11 cents in Cleveland and 10 cents in Ashtabula, a difference in favor of Cleveland on account of the higher taxes and rents. At present the men are getting 13 cents a ton, and at 40 cents an hour the cost of handling at Milwaukee was reduced to 7 cents a ton, taking the material from the hold of the vessel and running it out 200 to 400 feet and returning the bucket to the vessel. The men were paid 40 cents an hour while unloading; they were paid the regular price for shoveling on the dock while working, but they were kept employed the year round. So that now the same men that fought against the system before could not be induced to return to the old per ton system. The cost of unloading here could be and should be reduced, and the laborers would be well paid and would live better than they do now if paid at 6 or 7 cents a ton, and all outside of shoveling can be done for a price not to exceed 1½ cents a ton.

As to the reloading of the ore from the cars on to the docks there, the men are paid by the day. Of course they work much slower than they formerly did. They shovel from the dock and load the cars at an expense not to exceed 5 to 7 cents a ton for the whole winter's average, and this to the greatest disadvantage, for the reason that the furnacemen will give an order for so many cars of one kind of ore this morning, and the men have to go to that particular pile of ore and load that, and then have to shift off ¼ mile perhaps to load some other kind of ore, and all this time are being paid for loading. But notwith-

standing that there is fully one half of the time that they are doing nothing, for which they are being paid, that is charged to that 7 cents a ton.

The speed of unloading before this machinery was introduced averaged about 500 tons per day. At Fairport a vessel of 2100 tons was unloaded in 17 hours—that is, 18 men took out 2100 tons in 17 hours. Formerly they took 12 hours to take out 500 tons. The average, including the time of the weighing and getting ready, is 1000 tons per day of ten hours. There is no boat on the lakes to-day large enough but what if she gets in by 7 o'clock in the morning she can leave before dark the same day working the proper number of hatches. Barge No. 104, loaded with authracite coal, was loaded at West Superior with 2340 gross tons, which was unloaded at the average rate for the whole cargo of 58⅝ tons per hour per hatch and carried back on to the dock. The trip of the bucket from the hold of the vessel and its return and hooking on again for the second trip has repeatedly been made in three-quarters of a minute.

Steamer, "2310 gross tons, reported on the 28th, 6 a. m.; commenced discharging 6.30 a. m.," that is 30 minutes making the dock, getting ready and getting out the buckets. I have known a vessel of less size than that being four days, with the old method, getting ready to unload "Unloaded 28th, 5.30 p. m. Actual hours 10½." That is 2310 gross tons. "Total time at dock 11 hours and 30 minutes," from the time she got into the dock until she steamed out. Here is another: "30th, 6.30 a. m.; commenced to discharge 7 a. m. Actual time 10 hours. Total time at dock 11½ hours." Here is another: "2415 gross tons. Actual hours working 10, less lost time, one hour."

Here is another vessel of 1853 tons, 11 hours. Another of 2409 tons, 12½ hours. And then these: 2645 tons, 13 hours; 2203 tons, 8½ hours; 2347 tons, 10½ hours; 2416 tons, 14 hours; 1622 tons, 8½ hours; 1795 tons, 11½ hours; 2383 tons, 15 hours. These variations show in many cases that some of the ore is loaded directly into cars and others on to a stock pile, and the waiting for cars was often a serious item in the delay. That would show a ratio of 5 to 25 as the average ratio of capacity for the same number of men now as compared with 1880. The output of the Lake Superior mines has been almost in that same direct ratio. In 1883 the total tonnage to lake ports was 1,692.000. In 1890 almost 7,000,000. That is, ten of the lower lake ports received that tonnage. This does not include Chicago. In 1884 there were only 200,000 increase. In 1885 there was a shortage of 300,000. Then from 1,500,000 it has increased to 2,200,000. Then from that it runs up to 7,000,000, and the equipment of the docks with proper ore-handling machinery has been in nearly the same ratio. The area of the dockage has not increased over 20 per cent. over that of 1880. But the capacity, by reason of storing the ore high and covering it without obstruction and running it back a long distance and utilizing the whole that they had, has made it possible to handle 7,000,000 tons. In 1887 the cost per ton per mile on the lakes was $2\frac{3}{10}$ mills. In 1890 it was $1\frac{3}{10}$ mills.

THIRD DAY.

After a reference to a paper by T. D Ledyard of Toronto on the magnetite mine at Belmont, Ont., the secretary read a paper by Jasper Whiting of the Illinois Steel Company, giving the results of some tests of the blast furnace gases of some of the plant of the company, extending over a considerable period. The paper is accompanied by a chart, the reproduction of which is necessary to a proper presentation of the subject.

One of the most important papers presented was that of Prof. John W. Langley of Pittsburgh on

Aluminum in Steel Ingots,

from which we take the following: Ferro-silicon has long been used as a quieting agent for steel, the first extended use having been made at Terrenoire, France, some ten years since. Now, it has been discovered that aluminum produces the same general result, only far more effectively and without leaving any appreciable portion of the quieting agent in the finished steel. Aluminum is being used regularly for quieting steel by the few steel makers who have learned to rely on its beneficial influence. Its employment is extending.

The aluminum in small pieces of ¼ or ½ pound in weight is thrown into the ladle during the tapping shortly after a small quantity of steel is already in it. The aluminum melts almost instantaneously, and diffuses with great rapidity throughout the contents of the ladle.

The quantity of aluminum varies slightly according to the kind of steel. For open-hearth metal containing less than 0.50 per cent. carbon, the amount ranges from 5 to 10 ounces per ton of steel. For Bessemer steel the quantity should be increased to from 7 to 16 ounces. For steel containing over 0.50 per cent. of carbon, aluminum should be used cautiously, the range in general being between 4 and 8 ounces to the ton. The quantities are, therefore, very minute, 4 ounces being 0.0125 per cent., while the maximum of 16 ounces is only 0.05 per cent.

The amount of gas which leads to unsoundness in steel is really very small. Professor Langley made the following experiment to show this fact. A mixture which would slowly give off gas when heated was spread in a thin layer on the interior of a mold for a 90-pound steel ingot. The metal was such that in a clean mold a sound ingot having the necessary indication of soundness—viz., a "pipe," a conical cavity extending from the top to a depth of one-fourth of the ingot—would have been formed. In the prepared mold, however, not only was there no pipe, but the ingot boiled and rose some 2 inches. On breaking it it was full of large blow holes. Now, the mixture on the interior of the mold could not have produced more than 30 cubic inches of gas, if it had all been set free, and thus would have been only $\frac{1}{64800}$ of the weight of the ingot.

The principal danger to be guarded against in the use of aluminum is that of causing excessive piping. The best results are secured by using just enough of the quieting agent to allow the top of the ingot to rise a little, and therefore to leave in it a small pipe.

One unexpected action of aluminum has quite recently been discovered by George G. McMurtrie, president of the Apollo Iron and Steel Company, Apollo, Pa.—viz., that it could be made to replace manganese—who has communicated the following: "We were quite successful in making a heat of open-hearth steel without the use of manganese, and send two bars and two sheets which you will notice were successfully rolled. Having watched the operation from the charging of the furnace to the casting of the ingots, which were subsequently hammered from 12 x 12 inches down to 6 x 6-inch billets, then rolled into sheet bars and then into sheets, I can say without hesitation that the entire operation was a practical success. Our ingots were as solid as any we have ever made. The molten steel lay as quiet in the mold as water.

"In hammering we took a strong heat, having the billet finished before the red short danger line (cherry red) was reached. The sheet bar was rolled without the slightest difficulty or excessive heat, and the only contingency in rolling the sheets was the extra loss of 4 inches in width, which was caused by the steel cracking in to that extent more than is usual with our ordinary material. The amount of aluminum used in the ladling was a fraction over ½ pound per ton of steel."

In a subsequent letter Mr. McMurtrie says: "We rolled a lot of No. 30 gauge sheets a few days ago from sheet made by substituting aluminum for manganese, and must say that the rolling was done in a most satisfactory manner, showing that for any purpose where manganese is an objection its use may be avoided by substituting ½ pound of aluminum per ton of steel. I might also mention that ½ pound of aluminum will so affect 20 tons of molten zinc as to make a marked difference in the appearance of galvanized sheet iron, and continues to show its effect for probably two to three hours while constantly dipping the sheets. As soon as the effect ceases to be noticeable 3 ounces will restore the peculiar luster.

"What little we have done has been prompted by an instinctive feeling that it cannot injure the quality of any other metal when used carefully, while the chances are in favor of making a decided improvement from the fact that it will make metal more fluid and castings more solid."

In conclusion Professor Langley avows his belief that the use of aluminum in steel ingots for quieting purposes is not covered by and does not infringe any patent.

Among the contributions to the discussion of R. A. Hadfield's paper is one by Prof. J. O. Arnold of Sheffield, England, which may be considered a spontaneous indorsement of some of the points brought out in Mr. Langley's paper. The results of Mr. Hadfield's experiments, however interesting from an academical point of view, have little bearing upon the commercial production of crucible steel and steel castings, because the difficulty of melting and teeming so mild a material and the consequent wear and tear of refractory material place it out of court as an every-day product capable of being manufactured in large quantities.

The present writer, assisted by the demonstrators and students of the Sheffield Technical School, has been engaged for some time upon a careful investigation of the effects of aluminum applied to the manufacture of tool steel and steel castings as produced in ordinary practice. The results obtained are extremely remarkable and interesting, and will, he believes, inaugurate a new departure in the manufacture of such steels. The detailed results of the research will form the subject of the inaugural lecture of the Sheffield Technical School Metallurgical Society, but, by permission of the council of that body, the following preliminary and abridged statement is made to the Iron and Steel Institute. The results of repeated experiments have:

1. Fully confirmed Mr. Hadfield's observations, that no general rise of temperature accompanies the addition of aluminum to molten steel, but that, if anything, the metal is rendered less fluid.

2. Induced the writer to dissent altogether from Mr. Hadfield's view, that the action of aluminum is an analogue of that of silicon. The writer's experiments show clearly that the effect of even small quantities of aluminum in producing steel free from blow-holes is perhaps the most remarkable phenomenon in the metallurgy of steel. Its action is about twenty times as powerful as that of silicon, and the resultant steel is far superior in ductility and toughness to steel rendered sound by the addition of silicon, when due precautions are taken to avoid the danger attending its use mentioned under heading 4.

3. Proved that the action of aluminum is almost certainly chemical. The writer has not yet completed this branch of the

research, but the results so far obtained are as follows:

That blow-holes proper are due to the non-oxidizing occluded gases, hydrogen, carbonic oxide, and nitrogen, separating (under a pressure of many atmospheres) from the steel just prior to solidification. It has been proved by repeated experiments, made in a specially constructed tube furnace, that metallic aluminum readily decomposes carbonic oxide below steel-melting heat with the formation of alumina and free carbon; in other words, the most powerful reducing gas known to metallurgists acts, in the case of aluminum, as an oxidizing agent. To confirm this reaction under the exact conditions of steel manufacture, the writer blew 40 gallons of pure carbonic oxide through a crucible of molten steel containing aluminum, and obtained an increase of 35 per cent. on the carbon present before passing the gas.

4. Indicated that the addition of 0.05 to 0.1 per cent. of aluminum causes mild crucible steel (carbon, 0.5 per cent.) to "pipe" freely, the cubic capacity of such pipe representing the contraction of the liquid metal occurring between the molten and pasty conditions. In the case of "blown" steel no such piping is observed, because the separation of gas bubbles more than counterbalances the contraction. In both ingots and castings piping has to be guarded against by special precautions, which will be dealt with in the main communication.

The writer has here to record the important result of the first practical application of Sorby's method of mioroscopically examining steel. It will be obvious that steel from which the occluded gases are removed, or do not separate, will be very susceptible to linear contraction. The disastrous effect of this in the case of castings of certain shapes firmly imbedded in rigid "compo" is well known to steel founders, from the fact that such castings are sometimes "pulled" in two.

A careful microscopical examination of the phenomenon of "pulling" has revealed the alarming fact that incipient pulling may exist which is quite invisible to the eye, even when aided by a powerful hand lens.

Polished test pieces were turned from such castings which appeared absolutely free from flaws, but on testing they stood less than half the maximum stress usually associated with their chemical compositions, and the fractures showed dark patches, some of them ¼ inch in diameter, where the air had penetrated and oxidized the crystals through microscopic fissures $\frac{1}{5000}$ to $\frac{1}{10000}$ inch in breadth.

All steel which has been unduly strained in tension while hot is permeated with these fissures, which may or may not be in communication with the atmosphere, but which in any case weaken the steel to a great extent. How far these conditions may obtain in forgings containing parts of highly unequal mass is a matter for further research. Another interesting point is whether or not the remarkable increase in toughness and capability of resistance to shocks obtained in annealed over unannealed castings is due in some measure to the closing up and welding of these contraction fissures.

(5) Shown that an addition of 0.05 of aluminum to high-class crucible-steel ingots, cast in such a manner as to avoid the evil of "piping," will bring about the following important results:

(*a*) Dispense with the addition of manganese, and so produce the ideal iron and carbon steel.

(*b*) Do away with the necessity of "wash welding."

(*c*) Save 25 per cent. of the time and fuel respectively occupied and used during the operation of "drilling," together with the resultant saving of wear and tear to crucible and furnace. A pure steel, lower in silicon and manganese than that at present produced, will thus be obtained, with a saving of some shillings per hundredweight.

R. C. Cole: The first work that was ever done in the matter of trying to remove blow-holes from steel was done in Cleveland, at the Cleveland rolling mills. They made some castings in sand from an open-hearth furnace where steel was to be rolled in plates, and added about one-twentieth of 1 per cent. of aluminum before pouring into the mold. There was not a blow-hole to be seen anywhere, while in every case where the aluminum was not used the blow-holes were very marked. That was done in the early part of 1886 at the Cleveland rolling mills.

William J. Keep of Detroit then presented a paper upon the influence of manganese in cast iron, to which we shall refer at a later date.

San Francisco News.

Some time since you had a dispatch from this city, averring that the molders' strike was at an end. This reminds me of the saying that to learn the news at home you must go abroad. The strike, though the men have long since been practically defeated and though the violence and intimidation which for a while accompanied it have ceased, is not yet over, and nothing occurred at the time referred to beyond the making public of an effort on the part of the men to secure arbitration, which the Engineers' and Foundrymen's Association decidedly declined to accept. The ranks of the strikers have been thinned by those sent East and by those who have found other occupations, but the remnant are striving as vigorously as before; that is, with the union business as rampant in the shops as ever. The question of arbitration is still discussed, especially since the appointment of the State Board of Arbitration, with Oscar Lewis, a foundryman, as one of the members. As there is a boycott on the iron from non-union foundries, the builders, who have plenty of trouble on hand with the mill strike and other matters, are beginning to ask whether this molders' strike cannot be arbitrated after all. They say that as the amendment to the constitution of the Iron Molders' International Union makes it impossible for a local organization to go on a strike until all the resources of arbitration have been tried, the founders are safe from any such strikes in the futures. But it would take very strong pressure to make some of the foundrymen arbitrate, as they feel that they are masters of the situation and that if the strike is settled after arbitration they may go further and fare worse.

For some reason or other, not very clearly understood, business in hardware and metals, as well as in nearly all other lines of trade, continues to be dull, and it is probable now that there will be no great activity for a couple of months hence. For one thing, the usual bright skies and warm sunshine of this portion of the year have kept away. The resultant has been, generally speaking, favorable to grain, but fruit has been kept in a backward condition, and there has been some fear, too, that if the weather did not change even grain might be unfavorably affected. The prospects are, though, for good grain crops and good fruit crops, too, and as prices for grain on this side the continent are far above what has been normal of late years, a thoroughly prosperous year may be anticipated.

The Shenandoah brought 350 tons of Eastern pig iron, the largest lot in a long time. Between her and the Colima we had to hand over 5000 kegs of nails, besides large quantities of bar and bundle iron, steel, pipe, &c. The M. P. Grace and the S. D. Carlton have brought 250 tons of Eastern pig iron, 2823 kegs of nails and a large assortment of miscellaneous iron, steel, hardware, &c. The Balkamah and the Glenorchy from England brought 500 tons of old iron, as well as a large quantity of merchant iron and 15,240 boxes of tin plate. Our rail receipts for the fortnight have been 11 cars of machinery, 11 do. of merchant iron, nine of iron pipe, five of hardware, three of steel, three of agricultural implements, two of stoves, and one each of steel beams, chains, wheels, barrows, wire and bolts; in all 50 cars. Pig iron continues dull at $23 to $25, to arrive, and $2 to $3 more, spot. We have received 222,868 boxes tin plate to date. The market is quiet at quiet at $6.50 to $6.62½. For pig tin the quotation is 21 cents. But there is little doing in either.

(*By Telegraph.*)

J. W. Kerr, the foundryman, on trial for the murder of Edward Coogan, on June 25, 1890, has been acquitted; the jury being only out three minutes. Judge Murphy charged strongly in his favor, referring particularly to his general good character and his right to defend himself and his employee Clausen. Acquittal was a foregone conclusion. Union molders or sympathizers attacked and beat Clausen, an employee of Steiger & Kerr. In defending him the shot was fired that killed Coogan. The defense claimed that it was fired without homicidal intent and aimed over the heads of the crowd to frighten them. Since that event Steiger & Kerr's foundry has been made a union one and after this it was generally understood that the molders would not press the case. The result establishes the right of an employer to defend his workmen against assaults with violence by the best means in his power.

For some time past the Carbon Iron and Pipe Company of Parryville, Pa., H. J. Seaman, superintendent, have been devoting special attention to the manufacture of low-phosphorus pig iron for open-hearth purposes, which is now being offered to the trade under the brand "Viking," the chief object being to obtain a pig combining low silicon with low sulphur. Generally speaking, in order to produce iron of extremely low silicon it has been found necessary to run the furnace on mottled and white iron, and by doing this iron of low silicon can be produced, but it almost invariably contains high sulphur. The Carbon Company have finally succeeded in manufacturing an iron of Nos. 1, 2 and 3 grade, with silicon under 1 per cent., and of late the silicon has been averaging under one-half of 1 per cent., as shown by the following analyses, which represent the working of the furnace for seven consecutive days. This combination of very low phosphorus, silicon and sulphur is something which has not yet been done by our English friends, and it is exceedingly desirable for open-hearth work:

Date.	Phosphorus.	Silicon.	Sulphur.
May 16.....	0.024	0.440	0.007
May 17.....	0.024	0.860	0.006
May 18.....	0.024	0.625	0.007
May 19.....	0.023	0.450	0.008
May 20.....	0.025	0.350	0.012
May 21.....	0.023	0.140	0.010
May 22.....	0.024	0.295	0.014

Wm. Martin, for a number of years secretary of the Amalgamated Association of Iron and Steel Workers of Pittsburgh, has just been engaged as superintendent of the industrial department of the Carnegie interests at Pittsburgh. This is a new department created by this concern,

and became necessary on account of the increased business of Carnegie Bros. & Co., Limited, and Carnegie, Phipps & Co., Limited. Mr. Martin's duties will require him to look after all disputes that may arise in any of the various mills of the above firms, attending to the details of the scales in the various establishments, and a general oversight of the interests of the companies. He assumed his new position on the first day of the present month.

Chicago Prices of Old Iron Rails and Wrought Scrap.

The diagram published herewith will be found of much interest to the Western manufacturers of bar iron, as well as those who deal in old rails and scrap iron. The information set forth in the diagram is compiled from the market reports of *The Iron Age*, and covers six years of varying conditions of trade. It begins with the period of depression following the financial troubles of 1884, and shows the gradual recovery in 1885 and 1886; the comparatively high prices of 1887; the decline in 1888; the depression and rapid recovery in 1889, the fair status of prices in 1890, and the situation in 1891 during the first few months. The price of bar iron is included in this chart, for the purpose of enabling comparisons to be easily made between the raw materials and the finished product. The relations which they bear to one another are worthy of study. The question may be asked, why were not old car wheels and cast scrap added to this chart? The reason is because the price of car wheels ranges between No. 1 forge and No. 1 mill and would badly confuse the lines on the chart, while cast scrap and No. 1 mill are often so closely assimilated in price that a line for cast scrap would also interfere with the clearness of the chart. For the purpose of completing the comparison, however, we give in the tables below the prices of old car wheels and cast scrap for the entire period. These tables refer to common bar iron per net ton, according to the usage of the trade, old iron rails and old car wheels per gross ton, and scrap iron per net ton, all f. o. b. Chicago:

Bar Iron.

	1885.	1886.	1887.	1888.	1889.	1890.	1891.
Jan..	$31.50	$33.00	$43.00	$35.00	$34.00	$37.00	$34.00
Feb..	32.00	33.00	43.00	34.40	33.50	38.00	34.00
Mar..	32.00	34.00	43.00	34.00	32.50	36.00	34.00
April	32.00	33.00	42.00	34.00	32.00	35.00	.....
May..	32.00	31.00	40.00	32.50	31.00	34.00	.....
June	33.50	31.00	38.00	32.00	31.00	36.00	.....
July.	33.50	31.00	38.50	32.00	32.00	36.00	.....
Aug.	33.00	31.50	39.00	33.00	33.00	37.00	.....
Sept	31.50	33.00	39.00	35.00	34.00	38.00	.....
Oct..	32.00	33.00	38.00	35.00	35.00	37.00	.....
Nov..	32.00	34.00	37.00	34.50	37.00	36.00	.....
Dec..	31.50	40.00	36.00	34.50	38.50	35.50	.....
Avge for year	$32.20	$33.20	$40.00	$33.80	$33.60	$36.40	

1885.

	Iron rails.	Car wheels.	No. 1 forge.	No. 1 mill.	Heavy cast.
January. ..	$18.00	$16 50	$17.00	$14.50	$12.00
February ...	17.50	15.50	17.00	15.00	12 00
March.....	17.50	15.00	18.00	14.25	12.25
April.....	17.50	14.50	18.00	14.00	12.50
May . ..	17.50	14.50	17.50	14.00	12.50
June.....	17.50	14.00	16.50	14.00	12.50
July.....	17.00	14.00	16.00	12 50	11.50
August	16.50	14 00	16.50	13.25	12 00
September...	18.00	14.50	16.75	14 25	12.50
October	18.00	14.25	16 50	14.00	11.50
November...	18.50	14.50	16 25	13.50	12.50
December....	20.00	15.50	18 00	14.00	13.00
Average for year.....	$17.80	$14.75	$17.00	$14.00	$12.25

1886.

	Iron rails.	Car wheels.	No. 1 forge.	No. 1 mill.	Heavy cast.
January	$22.50	$18.00	$19.50	$15.00	$13.00
February.....	22.00	17.00	20 00	14 50	13.50
March	20.00	16.50	19 00	14.00	13 00
April.....	20 50	16.00	18.50	14.00	13.00
May	19.50	15.00	18.00	14.00	13 00
June	18.50	15.50	17 50	14.00	13.00
July..... ...	19.50	15.50	17.50	14.25	13.50
August.	20.50	15.50	17.50	14.50	13.50
September...	22.50	16.00	18 00	15.00	13.50
October.. ...	23.50	17.00	20.50	15 25	14.00
November....	24 50	18.00	20 75	16.25	15.00
December....	24.50	19.00	21.50	16.50	15.50
Average for year.....	$21.50	$17.50	$19.00	$14.75	$13.50

1887.

	Iron rails.	Car wheels.	No. 1 forge.	No. 1 mill.	Heavy cast.
January	$27.00	$21.50	$25.00	$19.00	$16.00
February	28.00	22.50	27 00	21 00	17.00
March.. ...	27.00	22.00	25.00	20.50	16 50
April.....	25 50	21.50	23.00	19.50	16.00
May	23 50	21.50	21.50	16.50	15 00
June.....	22.50	20.25	20.00	16.00	15.00
July.....	23.50	21 00	19.50	15.50	15.00
August	25.00	22 00	21 50	16.50	15.50
September...	25.50	21.25	22.00	16.75	16.00
October	23 50	21.00	21.25	16.25	16.00
November...	22.00	20.75	20.50	15.75	15.25
December....	21.00	20.50	20.00	15.50	15.50
Average for year..... .	$24.50	$21.25	$22 25	$17.40	$15.75

1888.

	Iron rails.	Car wheels.	No. 1 forge	No. 1 mill.	Heavy cast.
January.....	$21.00	$21.00	$21.00	$16.00	$16.00
February....	22.00	21.00	21.00	16.00	16.00
March	21.00	20.50	20.50	15.50	16.00
April	20.50	20.00	19.50	14.00	15.00
May.....	20.00	19.00	18.50	13.50	14.00
June.....	18.00	18.50	17.50	12.50	13.00
July	19 00	18.50	16.50	12.00	12.00
August	23.00	19.00	17.00	13.50	13.50
September ...	25.00	19.00	19.50	15.50	14.00
October.....	24.00	20.00	20.50	16.00	14.50
November....	23.00	19.50	20 50	15.50	14.50
December	22.50	19.25	20 50	15.50	13.50
Average for year	$21.50	$19.50	$19.50	$14.75	$14.25

1889.

	Iron rails.	Car wheels.	No. 1 forge.	No. 1 mill.	Heavy cast.
January.....	$21.50	$19 00	$20.00	$14.00	$13.50
February	20 50	19.00	20 00	14.00	13.25
March.....	21.00	18.50	19.50	14 00	13.00
April.....	20 00	17.50	18 50	13.50	12.50
May.....	19 50	16.50	17.50	13.00	11.50
June.....	20.00	17.00	17.50	13.00	11.00
July.....	21 50	18.00	18.00	14.00	11.50
August.....	22.50	18.50	18.00	14.25	12.00
September...	24.50	18.25	19.50	14 50	12.00
October	25.25	18.75	21.00	16.00	13.00
November...	26.00	19 00	21.50	17.00	13.50
December....	26.25	20 00	22.00	17.50	14.50
Average for year	$22.40	$18.25	$19.50	$14.50	$12.50

1890.

	Iron rails.	Car wheels.	No. 1 forge	No. 1 mill.	Heavy cast.
January.....	$26.00	$20.00	$20.50	$16.50	$14.00
February	25.00	19.50	19.50	16.50	13.50
March.....	23.75	19.00	19.00	15.50	13.50
April.....	23.00	19.00	18.50	14.50	13.00
May.....	22.50	19.00	18.00	14 00	13.00
June.....	25 00	19.00	19 00	15.50	13.00
July.....	26 00	19.25	20.00	16.00	13.00
August	26.50	19.50	20 50	16.50	14.00
September...	27.00	19.25	21 00	16.50	13.50
October.....	26.50	18.75	21.00	16.00	13.50
November...	25.50	18.75	20.50	15.50	13 50
December....	25.50	18 00	19.00	14.50	13.50
Average for year.....	$25.00	$19.00	$19.75	$15.75	$13.50

1891.

	Iron rails.	Car wheels.	No. 1 forge.	No. 1 mill.	Heavy cast.
January.....	$22.50	$17.75	$18.25	$14.00	$12.50
February	23.00	17.25	18.50	13.75	12.50
March.....	23.25	17.00	18.25	13.75	12.50
Average for three mos..	$23.00	$17.33	$18.33	$13.83	$12.50

The following table is a summary of all the yearly averages above given:

	Bar Iron.	Iron Rails.	Car wheels.	No. 1 forge.	No. 1 mill.	Heavy cast.
1885.....	$32.20	$17.80	$14.75	$17.00	$14.00	$12.25
1886.....	33 20	21.50	17.50	19.00	14.75	13.50
1887.....	40.00	24.50	21.25	22.25	17.40	15.75
1888.....	33.80	21.50	19.50	19.50	14.75	14.25
1889.....	33.60	22.40	18 25	19 50	14.50	12.50
1890.....	36 40	25 00	19.00	19 75	15.75	13.50
1891*	34.00	23.00	17.00	18.33	13.83	12.50

* Three months.

New Electrical Devices.

There was a gathering of notable business men in the offices of the Troy Dynamo and Electrical Supply Company, Thursday and Friday last. They were assembled in the Troy, N. Y., office for the purpose of inspecting the inventions of Charles F. Winkler of Troy. Among many devices are a storage battery, motor and dynamo, all of which promise to make quite a stir in the world of electrical apparatus. The Pruyn Mfg. Company have been organized for the purpose of manufacturing these devices.

The Winkler motor, when applied to cars, is going all the time, whether the car stops or not. The car is started by the momentum. In the Winkler storage battery acidulated jelly, instead of acidulated water, is used, and the battery is said to be capable of developing great power and speed. Mr. Winkler's new dynamo may be handled without fear of a shock. The gathering were much pleased with the new inventions. They were all directors or stockholders in the Pruyn Mfg. Company, and included the Rev. Dr. Tatlock, Henry S. Pruyn, Geo. E. Greene, H. J. Greene, A. L. Johnson, E R Estabrook, J. H. Starrett and John B. V. Quackenbush, of Hoosick Falls; W. L. Hall of Troy; Dr. Louis Bell and William A. Rosenbaum of New York. The manufacture of Mr. Winkler's inventions will be begun at once at the company's plant at Hoosick Falls, N. Y.

The grand Columbian tower, 1150 feet high, projected at Chicago as one of the attractions of the World's Fair, will probably not be built, although much of the preliminary work has been done. The reason assigned for the failure of the scheme is that the time is too short for the construction of the tower, but it is more than likely that financial considerations have had greater weight than any other. A large part of the capital of the company had been subscribed, but the directors very wisely deferred the placing of contracts until they were certain that they had enough money secured to prevent the failure of the undertaking when half completed. The abandonment of this scheme, is, however, unlike Chicago. The reputation of the enterprising citizens of the Western metropolis for push and enterprise should have caused it to be carried through at all hazards.

The Iron Age

New York, Thursday, June 11, 1891.

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The Western Trade Outlook.

Our readers can hardly have failed to observe the relapse into dullness of the Western iron market after a short season of encouraging activity. The change was most unwelcome, because indications of continued active business had been apparent to almost every one interested in that direction. In fact, it is very hard to reconcile the views of the prominent leaders of the trade with the actual facts in the case. In place of the market actually broadening, as one branch after another felt the impulse of either better times or an imperative need of raw material, the purchasing movement was confined to narrow channels with special influences operating. It has been clearly developed that thus far a great underlying basis to good business has been lacking. Spurts of activity may take place in special lines, but something more is needed to bring about a return of real prosperity, so far as the West is concerned. This is the appearance of the railroad interests in the market. These consumers of enormous quantities of iron and steel, whose voracious requirements in the past have so stimulated the development of the iron trade, are practically somnolent today, and give but few signs of awakening from their lethargy. Better inquiries for steel rails are reported, and the indications are more pronounced in favor of a good business in that branch than at any previous time this year, but so far the prospects of the rail trade have been too closely confined to indications, while in other directions even indications were lacking.

The reappearance of dullness, however, is not to be regarded as absolutely discouraging. In fact, the buying movement began a little too early to be continued, and it might have been perceived that it would prove to be only a spurt. The interval to the realization from Western crops was too great to be bridged over by continuous buying on the part of interests wholly disconnected with railroads, and the attitude of railroad managers has been quite clearly defined with regard to purchasing supplies. They will not do so until the necessity of such action is forced on them by increased traffic. But it is positively certain now that crops will be large, as the critical point has been passed and the harvest is very close at hand in the great wheat belt. The dullness now experienced may continue through June and perhaps be extended into July, but it cannot last much onger in the nature of things. Conservative business men are perhaps wise in taking a bearish view of the immediate situation, but they should not permit that frame of mind to become chronic. The most astute stock operators are "bulls on the country," even if the immediate outlook may be discouraging. They know that lively times are ahead as soon as agricultural interests are firmly established on a prosperous basis.

Syndicating manufacturing establishments is more difficult of accomplishment than when it was first sprung on the American and British public. Not a few very promising ventures in this respect have recently faded into the realm of the unrealized, although they were announced with much flourish when first born, and seemed secure of accomplishment. Investors are disposed to be very chary about taking stock in manufacturing concerns unless they practically hold a monopoly in their line. An unbroken financial success for a quarter or a third of a century may mean nothing for the future of a large manufacturing enterprise, and the sharp-sighted investor knows it. The personal equation enters into the profitableness of manufacturing to a greater extent perhaps than in any other line of trade. The withdrawal of the ingenious mechanic or the brainy man of business who has built up a works may mean dry rot afterward, and a syndicate cannot always fill such a place, because there are some things which money cannot buy. The announcement that a syndicate has been formed to purchase an important plant or a group of works is therefore getting to be regarded with a great deal of skepticism.

As we announced last week, the two leading steel works in the West have made their purchases of lake ores for the season, Bessemer ores selling as much as $1.50 below last year's prices, while the reduction on non-Bessemer ores was from $1.20 to $1.40 per ton. The purchases made have been small, however, because a good deal of ore was left over from last year. How much it is impossible to ascertain, because a large number of consumers overbought last year, and are still carrying some of the dearer ore. A good deal of emphasis has been put by the ore sellers on the fact that last year's ore was all sold. But the circumstance was not dwelt upon that the purchasing capacity for this year was considerably contracted by the inability to consume all that was taken then. The congestion all along the line is having its effect at the mines. Smaller companies have practically closed down, the larger ones have been working with a much reduced force all winter, and yet they have accumulated stock piles at the mines which at least some of them intend to carry over to next year partially. So far as the furnacemen are concerned, the possession of last season's relatively dear ore places them in a very unfavorable position, since they must compete with product from much cheaper raw material, with little prospect that advancing markets will let them out. So far as the near future of valley furnacemen is concerned, their highest hopes do not go beyond the prevention of a decline in values for the next month or two.

Correspondence.

Aluminum in Juniata Pig Iron.

To the Editor: The question of the value and effect of alloying aluminum with iron for foundry use is receiving much attention. It is believed that sources of supply will be of interest. When it was the common practice to make iron from the ores near the furnace, the characteristics of pig iron were more marked than at the present time. The pig iron made in the Juniata Valley has always been known as a peculiarly good iron, its fluidity and strength commending it to the founder, but the cause of these qualities has been imperfectly understood.

Four years ago the attention of the writer was called to this iron by Gustav Lindenthal, the well-known engineer, of Pittsburgh, who then said that many tests had been made by Pittsburgh iron masters to find the combination that gave it its peculiarity, and that it was attributed to aluminum. The combination of aluminum and silicon makes even the closer iron undesirable for puddling, but until recently no extended practical tests were made to determine how the iron could best be used.

The Marshall Furnace, at Newport, Perry County, is perhaps the best known furnace in the valley, and as it uses almost wholly the native ores, their analyses may be instructive. The larger percentage of ores used are:

	Grafton Fossil. (Analysis dried at 212° F., May 26, 1891.) Per cent.	Juniata hematite. (Analysis dried at 212° F., May 28, 1891.) Per cent.
Silica	10.650	17.580
Alumina	12.469	5.992
Sesquioxide of iron	73.481	Oxide of iron, 71.133
Oxide of manganese	0.431	0.700
Phosphoric acid	1.170	0.895
Sulphuric acid	None.	None.
Lime	Traces.	Traces.
Magnesia		
Combined water and organic matter	2.700	10.700
Totals	100.931	96.700

The pig iron shows by analysis 0.267 per cent. metallic aluminum and from 3 to 5 per cent. silicon. The Grafton Mines are owned by the furnace company. The hematite is mined within 3 miles of the furnace.

The combination of aluminum and silicon gives this iron a close grain and a peculiar whitish cast which misleads the founder, buying as he does by fracture. As the influence of even one-quarter of 1 per cent. of aluminum is known to have a wonderful effect on iron, but as carbon in the combined state is more sensitive to its action than graphitic carbon, it should be the study of the founder to use this iron in mixture with closer irons or more scrap. Such an iron will have the effect of the higher silicon pigs, together with the increased strength that it is known aluminum gives. For instance, the Juniata iron, even the close grades, will carry one-half No. 2 pig for light work, and for heavier machine work it will carry safely one-half of the burden either of No. 3 pig or scrap, giving a stronger, denser and cheaper casting than can be obtained in any other way.

Within the last four weeks a series of tests has been made, under the supervision of David J. Matlock of I. P. Morris Company and the writer, of the iron as it came from the furnace without remelting. The iron was taken from the runner and

used in making a large variety of work, varying in size and thickness; the patterns were selected so as to make the tests as severe as possible. Oven slides ½ inch in thickness, 16½ x 17 inches, ran perfectly. These were placed on two blocks 2 inches high, 14 inches apart, and bore a weight of 270 pounds, bending without breaking. Machinery work of various sizes was also made. The largest casting made was as satisfactory as the smaller ones, all of them being very dense, yet easily worked. As the pig iron made at the same time was very close the showing in the lighter work was certainly remarkable. Test bars 1 inch square, 14 inches long, broke at 21,000 pounds tensile strain; these were made at the same time. The iron before pouring had the appearance of iron treated with aluminum alloys. The study of such an admixture should result in more satisfactory work in the foundry and it certainly will be along the line of economy.

C. T. HOLBROOK.

Heavy Contracts.

The Lewis Foundry and Machine Company, Limited, of Pittsburgh, have just received a contract to furnish a 10-inch iron rolling train with the necessary equipment of machinery for the Monlevade Iron Works, to be located near Rio Janeiro, Brazil. The machinery for the above, and a plant for the manufacture of horseshoes, horseshoe nails and car wheels, has been purchased in the United States by Dr. De Monlevade, and will be shipped to its destination as soon as completed. The purchase of this machinery in the United States was made possible by the reciprocity treaty now existing between the United States and Brazil, and the Lewis Foundry and Machine Company, Limited, have the credit of building the first rolling-mill machinery ever constructed in this country for shipment to Brazil. They are now at work on the order, and will complete and ship it at the earliest possible moment.

The same firm have received an order from the Benwood Iron Works of Wheeling, W. Va., for a 24-inch nail and skelp plate mill. This mill will be one of the best equipped of its kind in the country, having a most complete set of manipulating tables and adjustments. In addition to the above, they have received a contract for the complete equipment for a puddle mill for the East Lebanon Iron Company, Lebanon, Pa., consisting of a double three-high 20-inch puddle mill and a 28 x 48 inch engine, squeezer with independent engine and ore-grinding machinery.

Last week they shipped one of their No. 0 lever shears, weighing 70,000 pounds, to Wm. Clark's Sons Company, proprietors of the Solar Iron Works at Pittsburgh. In addition to the above they have a number of other contracts on hand, and are operating their entire plant to its utmost capacity. The orders now in hand by this firm are sufficient to keep them fully employed for some time to come.

The Gordon Fire-Brick Stove.—The improved fire brick stove illustrated and described in *The Iron Age* of June 4, was designed by Gordon, Strobel & Laureau, Limited, engineers, manufacturers and contractors, of Philadelphia, Pa.

Last week there was turned out at the Edgar Thomson Steel Works of Carnegie Bros. & Co., Limited, at Braddock, Pa, 7000 tons of standard sizes steel rails. At the plant of the Allegheny Bessemer Steel Company at Duquesne, Pa., also owned by this firm, there was turned out for the same period 4000 tons of steel rails, or a total of 11,000 tons for both plants.

A Larger Pig Product.

As was to be expected, the collapse of the coke strike has led to the blowing in of a considerable number of furnaces, nearly all of them of large capacity. Some plants have started since the 1st of the month, and others, it is announced, will follow, so that in all probability July 1 will see us making iron again at what may be termed a normal rate.

The weekly product of all the furnaces on June 1 compared as follows with that of preceding periods:

	Furnaces in blast.	Capacity per week. Gross tons.
June 1	258	146,782
May 1	227	115,590
April 1	228	113,483
March 1	257	134,526
February 1	294	146,050
January 1, 1891	302	167,599
December 1, 1890	340	183,846
November 1	342	177,958
October 1	336	179,263
September 1	323	171,776
August 1	324	164,798
July 1	336	175,727
June 1	345	180,791
May 1	344	180,099
April 1	344	178,474
March 1	343	180,991
February 1	334	173,651
January 1	333	174,038
December 1, 1889	328	169,151
November 1	323	165,225
October 1	311	151,057
September 1	294	134,068
August 1	286	145,899
July 1	285	141,419

The report of the charcoal furnaces shows the following:

Charcoal Furnaces, June 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England	14	5	410	9	820
New York	8	1	110	7	650
Pennsylvania	16	1	71	15	840
Maryland	16	1	118	5	510
Virginia	18	2	230	16	770
Ohio	10	4	333	6	384
Kentucky	1	1	105	0	0
Tennessee	7	4	1081	3	262
Georgia	4	1	360	3	310
Alabama	13	6	1,545	7	1,280
Michigan	27	11	3,491	16	4,490
Missouri	2	1	317	1	266
Wisconsin	5	3	1,515	2	850
Texas	4	1	150	3	780
California	1	0	0	1	120
Washington	1	0	0	1	170
Oregon	1	1	220	0	0
Totals	138	43	10,056	94	12,519

As compared with previous months the record stands as follows:

	Furnaces in blast.	Capacity per week.
June 1	44	10,056
May 1	59	9,720
April 1	41	9,295
March 1	51	10,890
February 1	56	11,365
January 1, 1891	59	12,280
December 1	67	12,738
November 1	70	13,262
October 1	66	13,380
September 1	63	12,904
August 1	59	10,745
July 1	61	12,511
June 1	61	12,312
May 1	52	10,698
April 1	52	10,804
March 1	50	12,606
February 1	58	11,378
January 1, 1890	59	11,485
December 1	66	12,779
November 1	67	12,893
October 1	63	12,047
September 1	60	11,327

Among the furnaces which have resumed are: Copake, in New York; Muirkirk, in Maryland; Centre, Madison, Mount Vernon and Pine Grove, to be followed this month by Jefferson and Scioto, in Ohio; Elk Rapids and Union, in Michigan; National, in Wisconsin; Attalla, in Tennessee; Rome, in Georgia, and Tassie Belle, in Texas. There have blown out during May: Stickney, in Maryland; Reed Island, in Virginia; Eureka, Spring Lake and Martel, in Michigan, and Fond du Lac, in Wisconsin.

The status of the coke furnaces was as follows:

Coke Furnaces, June 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York	6	4	3,752	2	1,620
Pennsylvania:					
Pittsburgh district	25	22	30,514	3	4,163
Spiegel	1	1	546	0	0
Shenango Valley	18	5	4,902	13	8,067
Juniata and Conemaugh Valley	19	8	3,905	11	4,610
Spiegel	1	0	0	1	400
Youghiogheny Val	5	1	667	4	2,057
Miscellaneous	4	0	0	4	2,288
Maryland	3	1	1,820	2	3,830
West Virginia	4	1	737	3	1,842
Ohio:					
Mahoning Valley	15	5	4,007	10	5,910
Central and Northern	16	10	8,310	6	4,284
Hocking Valley	14	3	1,354	11	2,910
Hanging Rock	15	10	2,123	5	1,470
Indiana	2	1	156	1	238
Illinois	19	6	8,744	13	13,865
Spiegel	0	0	0	0	0
Wisconsin	4	2	1,524	2	1,450
Missouri	6	0	0	6	3,340
Colorado	2	1	690	1	500
The South:					
Virginia	14	10	5,825	4	1,448
Kentucky	4	2	532	2	560
Alabama	37	21	14,740	16	8,790
Tennessee	11	8	4,489	3	1,195
Georgia	2	1	703	1	297
North Carolina	1	1	125	0	0
Totals	248	124	100,165	124	75,714

As compared with previous months, the active coke furnaces make the following showing:

	Furnaces in blast.	Capacity per week.
June 1	124	100,165
May 1	98	70,529
April 1	96	67,570
March 1	113	85,083
February 1	125	94,473
January 1, 1891	143	112,153
December 1	168	127,634
November 1	168	122,555
October 1	170	127,247
September 1	156	119,757
August 1	150	113,040
July 1	163	120,673
June 1	167	123,340
May 1	169	122,489
April 1	173	121,560
March 1	169	122,595
February 1	169	118,568
January 1, 1890	169	119,396
December 1	162	116,319
November 1	160	112,269
October 1	154	102,454
September 1	141	96,744

On the 1st inst. the status of the anthracite furnaces was as follows:

Anthracite Furnaces, June 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York	19	8	2,974	11	3,238
New Jersey	12	4	1,753	8	2,207
Spiegel	3	2	175	1	45
Pennsylvania:					
Lehigh Valley	47	29	10,456	18	7,611
Spiegel	1	1	74	0	0
Schuylkill Valley	30	18	8,398	12	3,420
U. Susquehanna Valley	19	9	3,150	10	1,645
L. Susquehanna Valley	17	8	3,706	9	3,031
Lebanon Valley	16	12	5,875	4	1,120
Totals	164	91	36,561	73	22,377

For a number of months past our records show the following:

	Furnaces in blast.	Capacity per week.
June 1, 1891	91	36,561
May 1	90	35,331
April 1	91	36,598
March 1	93	38,543
February 1	95	40,212
January 1	101	43,166
December 1, 1890	105	43,474
November 1	104	42,141
October 1	100	38,627
September 1	104	39,115
August 1	106	41,013
July 1	112	42,543
June 1	117	45,142

May 1	123	46,912
April 1	119	46,110
March 1	115	45,790
February 1	107	43,905
January 1	105	42,857
December 1, 1889	100	40,053
November 1	96	40,603
October 1	94	36,558

The changes during the month have not been important. In the Schuylkill Valley, Mount Laurel is to be added to the list of producers. The second Lock Ridge of the Thomas Iron Company and an additional furnace of the Allentown Iron Works were blown in in the Lehigh Valley. Marshall, in the Upper Susquehanna, has just stopped. No. 2 Paxton is soon to start.

The collapse of the coke strike has led to the resumption of a considerable number of coke furnaces, but it must be noted that our table includes only those which started on or before the 1st of this month. Others have been blown in since then, so that our report does not reflect fully the effect of the resumption of work, and the Connellsville district, Allegheny County, has only three furnaces idle—one Edgar Thomson, which will probably go in durthe present month; Edith, which is undergoing extensive repairs and will not be ready before August, and Isabella, whose repairs are expected to be completed at about the same time.

The Troy Steel and Iron Company have overcome the effects of the fire in the engine house. On the 1st inst. there were running in the Shenango Valley five furnaces; on the Juniata, the Cambria started an additional stack, and Dunbar made its first cast on the 16th ult. In the Mahoning Valley, Hubbard blew in one furnace on the 1st, and Hannah, Anna, and Mary have since resumed. The Cleveland Rolling Mill Company are operating one stack, Steubenville has started, and in West Virginia, Riverside is again producing. In Wisconsin, Mayville and one Bay View resumed on the first. The Illinois Steel Company has blown in Nos. 5 and 6 of its new plant. Virginia has Roanoke and Rockbridge again running, while in Tennessee one of the North Birmingham stacks of the Sloss Company is idle.

The stocks of the anthracite and charcoal furnaces remain practically stationary, the latter having decreased slightly over that of last month.

It is, of course, when we turn to the coke furnaces that we find the most noteworthy figures, the stock now in the hands of these furnaces being the lightest yet reported. The figures given in this connection will probably never be discounted now that the valley furnaces are once more resuming operations. Generally speaking, the stock now in hand is held by the larger individual furnaces, although the several large groups of furnaces are in almost every instance sold up.

Coke furnaces to the number of 93, 14 of which were idle on June 1, and whose combined weekly capacity is 75,460 tons, report a stock of 137,331 tons, against 89 furnaces and 164,635 tons of stock on the 1st of last month. Returns from 45 active and 9 idle anthracite furnaces, having a capacity of 23,000 tons per week, show that they are carrying 145,065 tons; while 40 charcoal furnaces, 15 of which are now out of blast, capable of producing 19,700 tons per week, carry stock to the amount of 137,286 tons.

The new whaleback steamer A. D. Thompson was successfully launched at the American Steel Barge Company's shipyard, West Superior, Wis., on June 6. The dimensions of the Thompson are: Length, 265 feet; depth, 24; beam, 38. She has triple-expansion engines and is expected to steam 16 miles an hour when loaded. Her capacity is 3000 gross tons. The Thompson will leave for Liverpool with a cargo of wheat in about a month.

OBITUARY.

NELSON HILLMAN CAMP.

Nelson Hillman Camp, a traveling salesman in the employ of the Charles Parker Company, Meriden, Conn., died in that city on May 31. He had been seriously ill for some 15 days and his death was not unexpected. Mr. Camp was born at Middletown, Conn., November 8, 1829. When 8 years of age he went with his parents to Missouri. Subsequently he resided in Kentucky and for a time worked at Berlin, Conn. He came to Meriden to reside in 1854, accepting a position as traveling salesman for the Charles Parker Company, and had been on the road continuously for 37 years, visiting nearly every State in the Union. The years spent on the road made Mr. Camp one of the best-known traveling salesmen in the country, and his services were highly valued by the company with which he was for so long a period connected.

JOHN NOBLE.

John Noble died on Monday at the residence of his daughter, Mrs. John C. Coates, at Albany. He was born on August 31, 1811, at Yorkshire, England, and came to New York in 1841. He organized the first wire mills in New York. It was for the firm of Cocker & Co., and he became superintendent. He gained a wide reputation in this country in 1858 when he exhibited his master work at Columbus, Ohio, consisting of 1 pound of metal drawn into a 10-mile wire. He amassed a large fortune, retired in 1867 and started in the building business. He built the largest portion of the residences on Madison avenue between Fifty-fifth and Fifty-sixth streets, in New York.

Nearly all the coke furnaces in the Birmingham district are in blast and running to their full capacity, and are reported as working nicely and turning out a less proportion of the lowest grades than usual. Shipments are being made nearly as fast as produced, mainly in filling old existing higher priced orders than the present market would command. Very few new orders at present prices are being accepted, except in a few isolated cases, although recently a block of 15,000 tons was sold on the basis of $10.25 for gray forge, f.o.b. furnace, Birmingham district, which, in furnace circles, is considered and criticised as much too low. Some two or three furnaces are piling up all their higher grades, declining to sell at present prices. Notwithstanding the small stocks in sight and in producers' and consumers' hands, the market is paralyzed, so to speak, and producers are complaining and feel depressed at the aspect of affairs, and wonder that with existing circumstances the market does not revive. The Louisville and Nashville Railroad shipped from Birmingham last month about 1000 cars of pig iron, and the Georgia Pacific nearly as much more.

It is announced that the American Screw Company of Providence, R. I., have secured nearly 4 acres of land in the very center of the city of Leeds, England, and that the plans are all completed and a large part of the contracts let for the erection of their English plant. The site is a most desirable one, being on the Aire River, near a branch of the Liverpool Canal, and embracing excellent railroad transportation facilities. The building which the company will erect will be 344 feet in length, 80 feet wide and two stories in hight, and has been designed with a view to securing the best possible ventilation and light. The product will be wood screws of English pattern, for which the works will have a capacity of from 5000 to 7000 gross of finished screws per day. The building in question is built on the extreme side of the grounds of the company, and can be duplicated at any time without securing additional property. Power will be furnished by a 300 horse-power engine and a Babcock & Wilcox 300 horse-power boiler. Charles L. Rogers of Providence is now in England directing the work of the company.

THE WEEK.

Considerable disturbance has been created in the Western Freight Association over the order issued by Chairman Midgley canceling the present division of through rates from the Missouri River, and instructing the lines to substitute division of rates based on the rates to and from the Mississippi River.

Lieutenant Peary and a party of scientists have sailed for Greenland.

A sharp war of rates has taken place on westbound traffic, lake and rail, the National Dispatch making the following figures from New York to St. Paul: 90, 87, 64, 42 and 32 cents for the different classifications per 100 pounds.

A further trial of the pneumatic guns of the cruiser Vesuvius is to be made.

There is some opposition in Cuba against the budget, which provides for the removal of export duties on sugar and tobacco, for an increase of the land tax on plantations, and for an increase in the tax on sugar and tobacco produce and on alcoholic liquors.

British tramp steamers are taking cargoes to Liverpool for a mere song, and cargoes destined for San Francisco can now be shipped to San Francisco via Liverpool cheaper than they can be sent direct from New York.

A contract for Maryland and Ohio tobacco has been awarded, and calls for 3000 tons of Maryland and 10,000 tons of Ohio, equivalent to 9000 hogsheads of the former and 20,000 hogsheads of the latter variety.

In the inaugural address delivered by A. H. Duke-Acland at the twenty-third annual congress of the Co-operative Societies of the United Kingdom, the statement was made that in the last 25 years of its growth of half a century the annual business of the retail stores increased from about $20,000,000 to $140,000,000, and that the membership rose from 175,000 to over 1,000,000. The business of the wholesale societies in England and Scotland has grown from almost nothing to $50,000,000 a year in the same period. The flour mills do a business of about $10,000,000 a year and the wholesale societies manufacture to the amount of $1,500,000, besides the output of other smaller productive societies of various kinds. The profits on sales of $216,000,000 were $20,800,000.

Cleveland, the lake city, is growing. The records of the Building Inspector's office show that permits were taken out in May for buildings, the cost of which was estimated at $331,000 more than the sum so invested in the corresponding month of last year, the figures being $857,005, against $526,393. The increase alone is at the rate of nearly $4,000,000 a year, and although it will not, of course, be maintained, the indications are that Cleveland will be enriched and beautified by the investment of at least $1,500,000 more in improvements on real estate than the handsome total of about $5,000,000 so expended in 1890.

The establishment is announced of an experimental line of pneumatic mail tubes between New York and Philadelphia.

MANUFACTURING.

Iron and Steel.

The managers of the Glasgow Iron Company, at Pottstown, Pa., have authorized their Executive Committee to take steps looking to the removal of the entire plant to a point in the western part of that town lying between the Philadelphia and Reading and Pennsylvania railroads. On this site the company own 23 acres of ground, on which their valley mill is located, formerly known as the Glasgow Steel Works.

At the time of the shut-down of the furnaces in the Mahoning Valley, Ohio, it was stated by the owners that in case the concessions demanded of the railroads and coke operators were conceded there would be no reduction in wages; otherwise when the furnaces resumed a reduction would take place. As the demands made by the furnace operators were not all conceded, a notice has been posted at the different plants informing the employees that a reduction in wages, averaging 10 per cent., will be made. The reduction went into effect on Monday, the 8th inst.

Cofrode & Saylor, Incorporated, proprietors of the Pottstown Bridge Works, at Pottstown, Pa., have just closed a contract with the Pennsylvania Railroad Company for the construction of 17 span deck plate girder bridges. Thirteen of these spans are for double track and four for single track. The weight of material necessary to fill this order will aggregate 600 tons.

No. 1 puddling mill of Cartwright, McCurdy & Co., at Youngstown, Ohio, which was destroyed by fire some months ago, is again in operation. The mill was rebuilt in two months to a day after the fire.

A meeting of the Board of Directors of the National Tube Works Company of McKeesport, Pa., was held in that city last week. Edward W. Converse of Boston was elected president, to succeed J. G. Converse.

Hannah Furnace of the Mahoning Valley Iron Company, at Youngstown, Ohio, which has been out of blast for some months, on account of the coke strike, resumed operations last week. During the shut-down about $60,000 was expended in making needed improvements and additions to the plant, which add considerably to the output of the furnace.

A press dispatch from Youngstown, Ohio, under date of 3d inst., says that the suit brought by Henry C. Crawford in behalf of Herbert C. Ayer, to prevent the transfer of the iron plant of Brown, Bonnell & Co. to the trustee for the creditors who purchased it at master commissioners' sale, has been advanced on the docket of the United States Supreme Court, and will be heard and a decision rendered early in the October term. In the meantime the plant will continue running under the direction of Receiver Brown.

The objections raised by interested parties, regarding certain points in relation to the leasing of the Anniston Pipe Works at Anniston, Ala., have been adjusted and the lease consummated, in Cincinnati, as previously reported. Mr. Gamble, of Proctor & Gamble, and others associated with him in the lease, will place the works upon a good working basis, and the plant will run to its fullest capacity.

It is the intention of the Woodstock Iron Company to put one of their new coke furnaces, at Anniston, Ala., in blast the latter part of June.

The sale, under receivership, of the Mary Pratt Furnace property, Birmingham, Ala., to have taken place June 2, 1891, did not occur, and has been indefinitely posponed, and it is supposed that some arrangement has been, or may be, effected with the dissatisfied stockholders, so that the property will not be sold and will cause the plant to again go into opertion. It has always been a paying property.

The Atlanta Iron and Steel Casting Company, recently organized at Atlanta, Ga., with a capital stock of $150,000, for the manufacture of malleable castings, has elected Edward Van Winkle president; H. L. Atwater, vice-president; A. R. Bryan, secretary, and W. H. Trezevant, treasurer.

The new 20-inch mill for the East Lebanon Rolling Mill Company, Lebanon, Pa., is being erected by the Lewis Foundry Company of Pittsburgh.

The Windsor Locks Steel Works, Windsor Locks, Conn., are undergoing repairs and a remodeling. New heating furnaces are nearly completed. A 250-horse power Fitchburg automatic engine will be put in with necessary boilers, so that the capacity of the works will be largely increased.

It is said that the Chateaugay Ore and Iron Company, of Plattsburg, N. Y., lose between $40,000 and $50,000 by the burning of their No. 4 separator.

The Iowa Rolling Mills, at Burlington, Iowa, have resumed operations after extensive repairs and improvements.

On Thursday the 4th inst., the 7-inch mill of the Youngstown Iron and Steel Company, at Youngstown, Ohio, turned out 22,000 pounds of 1¼-inch cotton ties, which is the largest amount ever made by the plant during the same time in its history.

On the 23d inst. Charles H. Spang, Jno. W. Chalfant, Campbell B. Herron, Geo. A. Chalfant, M. A. McNeil, Jno. C. Porter, Walter C. Steele, James B. Herron, will make application to the Governor of Pennsylvania for a charter for the Spang Steel and Iron Company of Pittsburgh.

A steel plant is contemplated at Allentown, Tenn.

It is reported that an English syndicate has contracted for the erection of an iron furnace at Queen City, Texas.

The directors of the Columbus and Hocking Coal and Iron Company, Columbus, Ohio, have elected the following officers: Henry H. Adams, president; W. E. C. Coxe, vice-president and general manager; W. J. Redington, secretary and treasurer; H. H. Mitchell, assistant secretary; F. W. Merrick, attorney; S. A. McManigal, auditor.

The muck mill of the Briggs Rolling Mill at Findlay, Ohio, has been destroyed by fire, resulting from an explosion of gas under the boilers. The loss is about $20,000 and is covered by insurance,

No. 6 Furnace of the Crane Iron Company, at Catasauqua, Pa., was lighted on the 6th.

Benjamin Atha & Co. of Newark, N. J., and John Illingworth & Co. of Harrison, N. J., have consolidated, and last week articles of incorporation of the Benjamin Atha & Illingworth Company were filed at Trenton. Benjamin Atha and John Illingworth dissolved their old partnership three or four years ago, having had a serious difference over an invention to which both made claims. Mr. Atha bought out Mr. Illingworth's interest in the old concern and organized a new partnership, while Mr. Illingworth, with the co-operation of other men, built new works in Harrison. Four or five months ago the consolidation scheme was first broached. It is said to have originated with Edward Spaeth of the Illingworth Company. It was agreed that the stock of the two concerns should be rated at their par value. Mr. Atha's company had issued $650,000 worth of stock and Mr. Illingworth's $350,000. Of the latter $250,000 was represented in the plant, while the other $100,000 represented a cash working capital. The two united make a capital of $1,000,000, all paid up. Benjamin Atha is to be president and treasurer of the new company, and Mr. Illingworth general superintendent of the manufacturing departments. The Jersey City works of Atha & Co. will be given up, and the machinery be removed to the mill in Harrison. The incorporators of the new company are Benjamin Atha, William Clark, Robert F. Ballantine, John H. Ballantine, Ira H. Atha and Hewes and Delong of the old firm of Benjamin Atha & Co., and John Illingworth, S. S. Dennis, Edward Spaeth, A. C. Denman and O. C. Woolson of the firm of Illingworth & Co.

Machinery.

The Canton Foundry Company of Canton, Ohio, have purchased a site at Hammond, Ind., to which they propose to transfer their works. The land lies north of the Grand Calumet River, within 20 miles of the center of Chicago.

The Menasha Wood Split Pulley Company of Menasha, Wis., have reduced the price of their standard small hard maple pulleys about one-half. These pulleys range from 3 to 8 inches in diameter and from 2 to 24 inches across the face, and their list price is from $2 to $26 each, according to size. The company are the original manufacturers of small split pulleys and made their own price-list, following the iron price-list for small solid pulleys. Having recently completed an automatic turning lathe, by which they are enabled to largely increase their production and to decrease the cost of small pulleys, the company have thought it fair to the trade to make a new and much lower price-list.

The Noyes & Nutter Mfg. Company, Bangor, Maine, are erecting a new foundry building at that place at a cost of $6000.

At a recent meeting of the stockholders of the Hanover Foundry and Machine Company at York, Pa., $40,000 was subscribed for the erection of a new structure.

The assets of the Brooklyn City Iron Works, Brooklyn, N. Y., which recently failed, are $21,202.65 and the liabilities $32,004.98. Theo. E. Green has been appointed assignee, and has given bonds in $15,000.

At the annual meeting of the Co-operative Foundry Company of Nashua, N. H., James McWheeney was elected president and T. W. Keeley treasurer and manager.

An electric freight locomotive is now being built at the Thomson-Houston Works, Lynn, which will weigh 10 tons and be of 60 horse-power.

Staver & Walker, Portland, Ore., have been awarded the contract of furnishing Reynolds' Corliss engine and boilers for the electric-light plant for East Portland.

McGahey Bros. will erect a foundry and engine works at Elkton, Va.

The Springfield Machine Tool Company of Springfield, Ohio, are running to the extent of their capacity in the effort to keep up with their orders.

Barbour, Stockwell & Co., Cambridgeport, Mass., iron founders and machinists, have recently erected new buildings situated in the block bounded by Broadway, Hampshire, Clark and Davis streets. The new plant consists of a foundry 175 x 75, machine shop 160 x 50, three stories, and pattern-storage building 160 x 60, three stories. The specialties of this concern are railroad castings and machinery for bread and cracker baking.

The contract for the machinery for operating the cable on the Third avenue surface road, New York, has been awarded to the Pennsylvania Iron Works Company of Philadelphia.

Hardware.

The Wheeling Lamp and Stamping Company of Wheeling, W. Va., are putting in a number of new lathes and otherwise increasing the capacity of their machinery plant. They report an excellent demand for their goods and are operating their works full time.

The Fred. J. Meyer Mfg. Company, Covington, Ky., department for the production of architectural iron work, are busily engaged upon several good-sized contracts, among which may be noted that for the new city post office at Washington, D. C., to cost $81,000; the Cincinnati, Ohio, City Hall, to cost $35,000. The company were also awarded, after much contention, the contract to supply the various post offices with cancellation punches.

John A. Miller, St. Louis, Mo., manufacturer of Miller's Patent Vehicle Wrench, advises us that this wrench is meeting with a large sale since it was placed on the market. The orders from the city trade alone have aggregated something like 100 gross in the past three weeks. Circulars giving full description of the wrench will be sent on application.

Ludlow-Saylor Wire Company, St. Louis, Mo., report a continued activity in their art metal department. Among the recent orders secured by them they mention the Third National Bank, St. Louis, which is to be fitted up with counter rails, doors, gallery rail, &c., made of brass and iron. They are also doing some work similar to the above for the Mississippi Valley Trust Company, St. Louis, to be finished in brass and copper.

Cordley & Hayes, 173 and 175 Duane street, New York, sole agents for indurated fiber ware, advise us that on the Star pails they are oversold nearly 6000 dozen, or about a month's product; and that they are now entering orders for July and August delivery.

The Hill Machine Company, Florence, Mass., will erect a brick pattern house, which will be 50 x 25 feet, 12 feet high, and fireproof.

The Beecher Mfg. Company's plant, at Meriden, Conn., has been purchased by the Peerless Button Hole Attachment Company, who will begin the manufacture of a patent wrench.

The Bailey-Farrell Mfg. Company of Pittsburgh have been granted a charter of incorporation, with a capital stock of $300,000. The new concern succeeds the old firm of Bailey, Farrell & Co., manufacturers of and dealers in plumbers' supplies, who have done business in Pittsburgh for many years.

The Rogers Fence Company of Springfield, Ohio, are uncomfortably crowded in their present spacious quarters, and are building an addition to their works. Their lawn-mover business is 50 per cent. larger than last year, and it is running nights to catch up with orders.

Joseph Dixon Crucible Company, Jersey City, N. J., call attention to the fact that Dixon's graphite grease is being used with satisfactory results by manufacturers of steam, hydraulic and hand elevators. It is also used on wire cables to prevent rust, and for the guides of elevators.

TRADE REPORT.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., June 9, 1891.

The market shows a considerable amount of strength, and with the single exception of Steel Billets, everything is firm, and in some cases a shade dearer. A great deal of business is being sent in, and it begins to look as though mills would start very full after the midsummer holidays. In this connection it may be proper to state that the order for 45,000 tons mentioned in our last is correct, as a general statement, but there is a misunderstanding as to the point of delivery, which is to be Chicago instead of New York City. The first portion of the order, however, will be placed among mills in this vicinity (Chester and Reading, Pa.), and Elmira, N. Y., the balance being left subject to future developments. Practically, therefore, it makes no difference as regards the actual business, but we regret that we were not as clear as we might have been in regard to the point of delivery.

Pig Iron.—Market not buoyant, but very firm. Consumers take only just what they need, and it would be a difficult matter to persuade them to take more, although there is little or no effort in that direction, as furnaces are in excellent condition. Favorite brands are scarce, and gradually creeping up, a few sales having been made at $18.25 for choice No. 1, although there is no general advance. Still $17.75 @ $18 for anything that can be classed as standard qualities are inside figures, and less than $17.50 is only quoted for special reasons, such as "a new brand," spot cash or a little off in point of quality. The same remarks apply to all the various grades, none of which appear to be in such oversupply as to necessitate any special pressure to realize. As regards the local market, therefore, it is in good condition, and with adequate support at other points it would be comparatively easy to secure a moderate advance all along the line. It is a matter of regret, however, that from elsewhere reports are not as favorable as might be expected, so that furnaces hereabouts are simply meeting the demand at current rates, meanwhile having an eye to movements at other points. This will doubtless continue until there is some indication of a change South or West, as it would be very unwise to offer a premium for shipments from outside points. For the present, therefore, quotations are about as follows, varying according to brand, point of delivery, &c.:

Ohio Sotteners, No. 1x	$19.00	@	$19.50
Ohio Softeners, No. 2x	18.00	@	18.50
Standard Penna, No. 1x	17.75	@	18.00
Standard Penna, No. 2x	16.50	@	17.00
Medium Penna, No. 1x	17.25	@	17.50
Medium Penna, No. 2x	16.00	@	16.25
Virginia, No. 1x	16.75	@	17.50
Virginia, No. 2x	15.75	@	16.00
Standard Neutral All-Ore Forge	14.75	@	15.25
Ordinary Forge Cinder mixed	14.00	@	14.25
Hot Blast Charcoal	20.00	@	22.00
Cold Blast Charcoal	24.00	@	27.00

Muck Bars.—Market firm, but not very active. Makers are inclined to accumulate little stock, in anticipation of a heavier demand soon as hot weather sets in, so that $27 @ $27.50, delivered, is as low as any one cares to quote for June or July delivery. There are buyers at a trifle less, but holders are firm and not disposed to make concessions.

Steel Billets.—Market unsettled and lower. Four by fours have been offered at $27.75, delivered at seaboard or on the Schuylkill, but buyers are holding off, and it is quite likely a firm offer of $27.50 would not wait long for a taker. No explanation is given for the change of tone, except that some of the mills want business.

Spiegeleisen.—Inquiries have been made for large lots on which $28 was quoted for 20 %, duty paid. It is claimed, however, that domestic furnaces can turn it out at about $26, so that no business can be worked in the foreign article under present conditions.

Ferromanganese.—Quiet at unchanged prices, say $64 50 @ $65, duty paid, for 80 %.

Steel Rails.—There is nothing of special interest, beyond the fact mentioned last week of a sale of 40,000 tons by the Scranton Mills. Small lots are in good demand, and mills have from six to eight weeks' work on hand, so that full employment for the balance of the year seems to be pretty well assured. Prices firm at $30, f.o.b. cars at mill.

Bar Iron.—Market shows an improving tendency, and while there is no great pressure of business mills are doing better than for some time past, and with less cutting in prices. There is a good deal of irregularity, as there always is, but an average improvement of half a tenth is maintained from the lowest, with some talk of still better figures on new business. Nominal quotations for best refined Bars are 1.75¢ @ 1.85¢, but on large orders these figures can probably be shaded, and at country mills 1.70¢ @ 1.75¢ f.o.b. are fair average quotations for good Iron.

Skelp Iron.—A somewhat better demand is reported, and sales within the past few days, to the extent of about 1000 tons Grooved at 1.72½¢, delivered, but there is nothing to indicate any important revival in the demand.

Plates.—The market is improving slowly, but surely. Mills are getting a very fair amount of work ahead, and attempts are being made to secure better prices, although so far this has only been successful as regards small lots. There is so much work in sight, however, that there is no reason to doubt that better prices will prevail before long, as mills are sure to be crowded with business later on. Meanwhile quotations for lots delivered are fairly represented by the following quotations:

	Iron.	Steel.
Tank Plates	2.00 @ 2.10¢	2.05 @ 2.20¢
Refined	2.20 @ 2.30¢	2.05 @ 2.10¢
Shell	2.30 @ 2.40¢	2.40 @ 2.50¢
Flange	3.20 @ 3.30¢	2.50 @ 2.75¢
Fire-Box	4.00 @ 4.25¢	3.00 @ 3.50¢

Structural Material.—Mills are moderately well employed for the present, and are looking forward to a period of great activity during the balance of the year. It is not expected that any additional contracts of importance will be closed until after midsummer, by which time financial and labor conditions will probably be definitely settled, although no serious trouble is anticipated in either direction. Meanwhile prices delivered are about as follows: Angles, 2.05¢ @ 2.10¢; Sheared Plates, 2¢ @ 2.10¢, and 10¢ @ 15¢ more for Steel, according to requirements. Tees, 2.5¢ @ 2.6¢; Beams and Channels, 3.1¢ for either Iron or Steel.

Sheet Iron.—Market active and improving. Manufacturers report a largely increased demand, with inquiries indicating a heavy business from this time forward. Prices for best makes about as follows:

Best Refined, Nos. 14 to 20	3.00¢ @ 3.10¢
Best Refined, Nos. 21 to 24	3.10¢ @ ....
Best Refined, Nos. 25 to 26	3.20¢ @ 3.30¢
Best Refined, No. 27	3.40¢ @ ....
Best Refined, No. 28	3.50¢ @ ....
Common, ¼¢ less than the above.	
Best Soft Steel, Nos. 14 to 20	3¢ @ 3¼¢
Best Soft Steel, Nos. 21 to 24	3¼¢ @ ....
Best Soft Steel, Nos. 25 to 26	4¢ @ ....
Best Soft Steel, Nos. 27 to 28	4¢ @ ....
Best Bloom Sheets, ¼¢ extra over the above prices.	
Best Bloom, Galvanized, discount	@ 67½ %
Common, discount	@ 70 %

Old Rails.—Iron Rails are practically out of the market, so that prices are almost nominal at anything from $21.50 to $23, according to the point of delivery. Old Steel commands about $18 for favorable deliveries; in other cases a trifle more or less than this figure, according to circumstances.

Scrap Iron.—Market dull and irregular. Efforts to force sales are met with an immediate drop in prices, but those who content themselves with meeting such demand as there is secure about the following figures: No. 1 Railroad Scrap, $20.50 @ $21, Philadelphia, or for deliveries at mills in the interior $21 @ $22, according to distance and quality; $15 @ $16 for No. 2 Light; $14 @ $15 for best Machinery Scrap; $13 @ $14 for ordinary; $15 @ $16 for Wrought Turnings; $10 @ $10.50 for Cast Borings, and nominally $24 @ $25 for Old Fish Plates, and $16 @ $17, delivered, for Old Car Wheels.

Wrought-Iron Pipe.—Demand improving and prices a little steadier, although extra discounts are still obtainable by large buyers. Nominal discounts as follows:

Butt-Welded Black	55 %
Butt-Welded Galvanized	45 %
Lap-Welded Black	65 %
Lap-Welded Galvanized	52½ %
Boiler Tubes, 2½ inch and under	55 %
Boiler Tubes, 2¾ inch and larger	60 %

Chicago.

(*By Telegraph.*)

Office of *The Iron Age*, 59 Dearborn street, CHICAGO, June 10, 1891.

Pig Iron.—A moderate business is being done in Coke, but large transactions are noticeably absent. The leading sellers, however, report a sufficient tonnage booked to make them comfortable for the present, and therefore maintain prices firmly. Coke Softeners have been in fair demand, and local Scotch brands have met with a ready sale, as well as Ohio Irons. The wide range of quotations given on Hocking Valley Iron has already been explained, but as there seems to be still some misunderstanding on this point it is well to state again that the price of this kind of Iron depends on the contents of silicon. Grades containing a high percentage command the best prices. The market for Southern Coke Iron is quiet and prices are a trifle easier. Lake Superior Charcoal does not stiffen, as had been hoped, sellers being still found at $17 or a little under. We quote for cash, f.o.b. Chicago:

Lake Superior Charcoal	$17.00	@	$18.00
Local Coke Foundry, No. 1	15.50	@	16.00
Local Coke Foundry, No. 2	15.00	@	15.50
Local Coke Foundry, No. 3	14.50	@	15.00
Local Scotch	16.00	@	16.50
Ohio Strong Softeners	18.00	@	18.50
Southern Coke, No. 1	16.00	@	16.50
Southern Coke, No. 2	15.25	@	15.75
Southern Coke, No. 3	14.50	@	15.00
Southern, No. 1, Soft	15.25	@	15.75
Southern, No. 2, Soft	14.00	@	14.50
Southern Gray Forge	14.00	@	14.50
Tennessee Charcoal, No 1	18.00	@	....
Alabama Car Wheel	22.50	@	23.50
Coke Bessemer	17.50	@	18.00
Hocking Valley, No. 1	17.00	@	18.50

Bar Iron.—One of the local mills captured a Car Iron order for some 1500 tons and smaller orders have been entered for other classes of consumers, but generally speaking the market has been very quiet and rumors are current of prices being made considerably under recent quotations. On ordinary specifications manufacturers are asking 1.65¢ @ 1.68¢, Chicago, half extras, but car specifications are taken at special rates. If there is weakness in the market it is by no means general, being confined to a very few works needing orders for their large mills. Muck Bar has been offered at $27.50, Chicago, by Pittsburgh parties. The jobbing trade is remarkably active at unchanged prices.

Structural Iron.—Contracts for large buildings have recently been made in quick succession, but there are still a few more important enterprises not closed. The World's Fair buildings are also coming along quite rapidly. Contractors are busy making estimates on them. Prices are unchanged, except, perhaps, in the case of Angles. Standard makes are well maintained, but others are offered very low, in some cases at 2¢, f.o.b. Chicago.

Plates.—General business has not been active, but there was a fair demand from stock during the week. Tank Plates are very firm. Store prices are unchanged.

Sheets.—The inquiry for Black Sheets has fallen off, but mills now seem to be well fortified with orders, and are holding quite uniformly to 2.85¢ @ 2.90¢, at mill, for No. 27. Galvanized Iron is gradually working into better condition, with an increased demand, and the mills are not now shipping so promptly as they did, but prices are about as low as before. Jobbers quote 3.30¢ for No. 27 Common Black, and 65 % off for Juniata Galvanized.

Merchant Steel.—Implement manufacturers have placed season contracts to a greater extent than usual at this time of the year, but there are still quite a number who are disposed to wait until the regular time. Machinery and Spring Steel contracts have ranged at about the same prices as last season, but Bessemer Steel Bars have gone lower, dropping below 1.85¢. The general Steel business is in very fair shape, store trade being in advance of last year, and the country jobbing trade giving out good stock orders. Usual quotations on carload orders are 2.30¢ for Machinery Steel, 2.40¢ for Open-Hearth Spring, 2.30¢ for Tire and 2¢ for Bessemer Bars, all from good stock. Tool Steel sells at 7¢ @ 7½¢ and upward, according to quality.

Track Supplies.—Although no large single sales of Steel Rails have recently been made, yet the volume of business is steadily increasing and some railroads are known to be arranging to place good-sized contracts. A heavy business is, therefore, quite confidently predicted by the manufacturers, who continue to quote $31 for most desirable orders. Nominal quotations prevail on Fastenings as follows: Iron Splice Bars, 1.85¢ @ 1.90¢; Spikes, 2¢ @ 2.10¢; Track Bolts with Hexagon Nuts, 2.80¢ @ 2.90¢.

Old Rails and Wheels.—Dullness rules in this line, and last week's quotations are repeated, viz.: $22.75 for Iron Rails, $14.50 @ $17 for Steel Rails and $16.50 @ $17 for Car Wheels.

Scrap.—Dealers report a better demand for Wrought Scrap, but other grades are very quiet; consumers are in some cases buying from the railroads at considerably lower prices than dealers' quotations, which are as follows per ton of 2000 pounds: No. 1 Railroad, $19; No. 1 Forge, $18.50; No. 1 Mill, $14; Fish Plates, $21; Axles, $23; Pipes and Flues, $13.50; Horseshoes, $18; Cast Borings, $8; Wrought Turnings, $11.50; Axle Turnings, $13; Machinery Cast, $12.50; Stove Plates, $8.50 @ $9; Mixed Steel, $11; Coil Steel, $15; Leaf, $16; Tires, $16.50.

Metals.—Copper shows continued strength in casting brands, which are now quoted 12¼¢ @ 12½¢ in carloads, while Lake is unchanged at 13¢. Spelter has improved slightly, prime Western being now held at 4.90¢. In Pig Lead quite a large business has been transacted here, upward of 800 tons having gone into consumption at values ranging from 4.20¢ to 4.30¢. At the close the market is very strong, 4.30¢ bid, 4.35¢ asked, with but little offering.

Joseph T. Ryerson & Son, 18 to 22 Milwaukee avenue, Chicago, have issued their stock sheet for June, showing the quantities and sizes of Plates, Sheets, Angles, &c., in their warehouse on the 1st inst. The publication comprises 32 pages of closely printed matter, including with the stock tables a great deal of information of practical value to boiler and tank makers. A new feature of the stock sheet for June is a well-arranged table of contents on the first page of the cover, which will be found quite a convenience by busy men.

A very important occurrence has happened this week in the Chicago Plate trade. The well-known house of W. S. Mallory & Co. have transferred their business to Joseph T. Ryerson & Son. The terms of the sale have not been made public. W. S. Mallory will engage in another line of trade. The employees will enter the service of Messrs. Ryerson & Son, who will continue to use the Mallory warehouse, which is needed to meet the requirements of their business, which has been rapidly growing in recent years. Their acquisition of the business of Messrs. Mallory & Co. puts them far in the lead among Western Plate houses. The transfer took effect immediately upon the signing of the documents.

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fourth and Main Sts., CINCINNATI, June 10, 1891.

Pig Iron.—There has been a quiet but steady market during the week, with fairly increased consumptive demand for Iron in moderate quantities, for which outbid quotations are generally exacted, but for any round lots of Gray Forge or the lower grades of Southern Foundry Iron there continue to be free sellers for summer and autumn delivery at previous quotations and even for deliveries running to the end of the year. It is not a question of whether the Iron can be obtained, but whether there are buyers for it. There were some contracts made of this kind early in the week, but during the last few days the trouble has been to find buyers; and yet this price of $10 at the furnace for Gray Forge is so low that no one seems to be disposed to shade it, and in fact there are some furnaces which are not in the market at that price. There have been moderate quantities of No. 1 Foundry Iron sold for delivery running ten months from July 1, which takes pretty well into next year. The offerings of No. 1 Foundry are comparatively small, but of No. 2 the supply is better, and of No. 3 ample, if not excessive. There is not much call for Charcoal Iron of any kind, but there was a small recent sale of Car-Wheel Iron. There is as yet no indication of a general resumption of work by the repair shops of the railroads, although there is a cropping out here and there of cars ordered to be put in order. The pipe works continue operations on a restricted basis, but the rolling mills appear to be enlarging their operations to a moderate extent:

Foundry.	
Southern Coke, No. 1	$14.75 @ $15.00
Southern Coke, No. 2	13.75 @ 14.00
Southern Coke, No. 3	13.25 @ 13.50
Ohio Soft Stone Coal, No. 1	16.50 @ 17.00
Ohio Soft Stone Coal, No. 2	15.50 @ 16.50
Mahoning and Shenango Valley	17.50 @ 18.00
Hanging Rock Charcoal, No. 1	20.00 @ 22.00
Hanging Rock Charcoal, No. 2	19.00 @ 20.00
Tennessee and Alabama Charcoal, No. 1	17.00 @ 17.50
Tennessee and Alabama Charcoal, No. 2	16.50 @ 17.00
Forge.	
Gray Forge	12.75 @ 13.00
Mottled Neutral Coke	12.50 @ 12.75
Car Wheel and Malleable Irons.	
Southern Car Wheel	19.50 @ 20.75
Hanging Rock, Cold Blast	20.00 @ 21.00
Lake Superior Car Wheel and Malleable	19.00 @ 20.00

Pittsburgh.

Office of *The Iron Age*, Hamilton Building, PITTSBURGH, June 9, 1891.

The general business situation is improving. The Coke strike is over and navigation has been resumed. Some 13,000,000 bushels of Coal were started yesterday by river for down-river markets, where it is wanted and will find a good demand at full prices. Crop reports are generally favorable, recent rains having been productive of great good. The carpenters' strike still continues, by reason of which business in the line of building is almost at a standstill, but there is reason to believe that the strike will be brought to a close before long.

Pig Iron.—Regular demand and prices steady as last quoted. Production is being increased by the starting up of valley furnaces, but there is also an increasing demand. It is pretty generally conceded that the present wage scale will be renewed July 1, without a hitch on either side. While the demand for finished material continues slow as compared with what it usually is at this season of the year, it is now increasing, and this will steady up the market for raw material. Stocks in first hands in this district are light, and furnaces in blast are well sold up. Prices may be fairly quoted as follows:

Neutral Gray Forge	$14.00 @ $14.25,	cash
White and Mottled	13.00 @ 13.50,	"
All-Ore Mill Iron	14.75 @ 15.25,	"
No. 1 Foundry	16.50 @ 17.00,	"
No. 2 Foundry	15.50 @ 16.00,	"
No. 3 Foundry	14.75 @ 15.00,	"
No. 2 Charcoal Foundry	21.00 @ 21.50,	"
Cold-Blast Charcoal	25.00 @ 27.00,	"
Bessemer Iron	15.75 @ 16.00,	"

City furnaces have sold considerable Forge Iron at $14, cash, delivered to city consumers, and this may be regarded as the ruling price, although valley furnacemen still aver that they can do better at home than in this market. Of sales of some 15,000 tons Bessemer reported, only one lot of 1000 tons was reported at $15.75; one other lot of 1000 tons at $16.15, while the rest was all at $16.

Muck Bar.—There has been rather more business during the past week, but no improvement in price; on the contrary, the market, if anything, is weaker. Quotations may be given at $26 @ $26.50, cash. We hear of sales involving some 4000 tons for delivery during the rest of this year at $26. Some makers are refusing to sell below $26.50, but buyers generally have no difficulty at present in obtaining all they want at $26.

Manganese.—Small sales of 80 % Ferromanganese, for immediate or near-by delivery, at $66.50, cash. This has been the ruling price for a couple of months or more.

Manufactured Iron.—There is a fair business, and in some lines it is increasing, but it is still short as compared with what it should be at this season of the year, which may be attributed in large part to labor troubles. Prices continue easy, and buyers have the advantage. City made Iron may be quoted at 1.65¢ @ 1.70¢ for Bars; 2.10¢ @ 2.15¢ for Tank and Plate, and 2.75¢ @ 2.80¢ for No. 24 Sheet, all 60 days, 2 % off for cash: Skelp Iron, 1.62½¢ @ 1.67½¢ for Grooved, and 1.80¢ @ 1.85¢ for Sheared, four months, 2 % off for cash. At valley mills prices are quoted upon a basis of 1.50¢ @ 1.55¢, half extras, for Bars. Some of the valley mills are well sold up.

Nails —The Cut Nail trade continues in an unsatisfactory condition. Not only is the demand light, but prices are irregular and unremunerative. We continue to quote at $1.55 @ $1.60, 60 days, 2 % off for cash, f.o.b. at factory, according to character of orders. The Wire Nail meeting in this city last week was not productive of any good results. It is still a go as you please market, each firm being free to make their own prices, and the prospect for an early improvement is not very encouraging. While $1.95 @ $2 at factory is quoted by manufacturers, it is said that sales have been made as low as $1.87½ and $1.90, 60 days, 2 % off for cash.

Structural Material.—There has been rather more inquiry within the past week, which, it is hoped, will lead to an increased business in the near future. Channels and Beams, 3.10¢; Angles, 2¢; Steel-Sheared Bridge Plates, 2.10¢ @ 2.15¢; Universal Mill Plates, 2.05¢; Tees, 2.60¢; Refined Bars, 1.80¢ @ 1.90¢.

Steel Plate.—But little new business reported, but mills are pretty well employed on old contracts. Prices unchanged: Tank, 2.10¢; Shell, 2.45¢; Flange, 2.65¢; Fire-Box, 3.90¢ @ 4.25¢.

Merchant Steel.—While business is by no means active, it is all possibly that can be expected. No change in prices: Bessemer Tool Steel, 7¢ @ 7½¢; do., Spring, 2½¢; do., Machinery, 2.40¢ @ 2.50¢; do., Toe Calk, 2½¢; Tire Steel, 2.20¢; Steel Bars, 1.90¢, full extras; Crucible Spring Steel, 4¢; Crucible Machinery, 5¢.

Barb Wire.—Manufacturers' rates remain unchanged, as follows: Glidden Painted, $2.85; do. Galvanized, $3.40; Four-Point Painted, $2.80; do. Galvanized, $3.30, f.o.b. at factory.

Wire Rods—There does not appear to be much inquiry, and in the absence of sales we quote nominally at $36.50 @ $37, cash, at maker's mill.

Old Rails.—There appears to be but little inquiry for Old Iron Rails and in the absence of sales they may be quoted at $23 @ $23.50 Old Steel Rails in freer request, with sales at $17.50 @ $18 for short and long pieces.

Billets and Slabs.—There has been an increased business the past week, but prices are lower; we now quote at $25 @ $25.50, cash, at makers' mill. Sales of some 5000 tons within the range quoted. There is one order on the market for a lot of 10,000 tons, which may be closed within a day or two, and it is said the same buyer will, sooner or later, want 20,000 tons additional.

Wrought-Iron Pipe.—The regular monthly meeting of the manufacturers' association took place here on Wednesday, June 3, but the only change made in prices was to advance those on Tubes somewhat. Discounts are as follows: On Black Butt, 55 %; on Galvanized, 45 %; on Black Lap, 65 %; on Galvanized, 52½ %; Boiler Tubes, all sizes up to 2½ inch, 55 %; 3 to 6 inch, 65 %; 7-inch and upward, 55 %; Casing, all sizes, 55 %.

Steel Rails.—There is an increasing demand and the price remains unchanged at $30, f.o.b. at mill. The mill at Duquesne, Pa., owned by Carnegie Bros. & Co., has been taken off Rails and placed on Billets again.

Railway Track Supplies.—There is an increasing demand for almost everything in this line, but prices remain unchanged. Spikes, $2.05, 30 days, f.o.b. at works; Splice Bars, 1.80¢ to 1.90¢; Track Bolts, 2.75¢ with Square and 2.85¢ with Hexagon Nuts. Looks as if the demand during the summer would be better than it has been during the spring season.

Old Material.—There is no improvement in demand, and prices continue weak: No. 1 Wrought, $19 @ $19.50, net ton; Iron Axles, $26 @ $27; Old Car Wheels, $16.50 @ $17, gross; Cast Scrap, $14; Mixed Steel, $16, gross; Rail and Bloom Ends, $17.50 @ $18. Dealers nearly all report trade as being very dull.

Connellsville Coke.—There is an increasing demand, caused by additional furnaces starting up, and shipments out of the region are increasing daily. Prices remain unchanged: Blast Furnace, $1.90; Foundry, $2.30; Crushed, $2.65. All per ton of 2000 lb for June delivery, f.o.b. at ovens.

St. Louis.

OFFICE OF *The Iron Age*, 214 N. Sixth st., ST. LOUIS, June 8, 1891.

Pig Iron.—The market has not shown much activity since our last report. Consumers are chary about buying beyond their actual requirements, and are looking for offerings of lower priced Iron within the next 30 days. The demand for No. 1 Foundry is keeping up, and $15.75, f.o.b. St. Louis, is considered an inside quotation. Gray Forge is dull on the basis of $10 at the furnace, at which figure some sales have been recently made. The immediate outlook is not very encouraging. The local pipe works are dull. Some foundries are not working to their full capacity, and there are complaints heard from other quarters which do not tend to improve the situation to any extent. Furnaces seem anxious to maintain prices, and are not disposed to shade the figures quoted below more than 25¢ ℔ ton. The effect of the tight money market is being felt, and consumers are husbanding their resources to meet other obligations. The next 30 to 60 days is likely to show a falling off in the demand, accompanied by a lower range of values. For immediate delivery we quote as follows, f.o.b. St. Louis:

Southern Coke, No. 1 Foundry	$15.75 @ $16.00
Southern Coke, No. 2 Foundry	14.50 @ 14 75
Southern Coke, No. 3 Foundry	14.00 @ 14.25
Gray Forge	13.25 @ 13.50
Southern Charcoal, No. 1 Foundry	17.50 @ 18.00
Southern Charcoal, No. 2 Foundry	17.00 @ 17.50
Missouri Charcoal, No. 1 Foundry	15.50 @ 16.00
Missouri Charcoal, No. 2 Foundry	15.00 @ 15.50
Ohio Softeners	18.25 @ 19.50

Bar Iron.—A fair amount of business in hand, with a prospect of more in the near future, serves to strengthen this department. Prices are quoted as follows: Lots from mill command 1.70¢ @ 1.75¢, delivered on cars at East St. Louis. Small lots from store are quoted at 1.82½¢ @ 1.87½¢.

Barb Wire.—Mills report a steady demand; in fact, unusually so for this season of the year. Prices are fairly well maintained as follows: Painted, 2.95¢; Galvanized, 3.50¢; carload lots 10¢ ℔ cwt. less than above prices.

Wire Nails.—The complaint from mills regarding the low prices at which they are compelled to sell their product continues. The immediate future is not encouraging in any respect, and the prices at present quoted are likely to prevail for some time to come. We quote as follows: Carload lots from mill command $2.10 @ $2.15, f.o.b. cars St. Louis.

(By Telegraph.)

The movement in Pig Lead is increasing and sales have been made in the last two days at 4.25¢. The market shows increased strength and offerings are limited; for immediate shipment 4.30¢ would have to be paid. In Spelter the trade is active, with prices tending upward. The market is quoted at 4.70¢, at which price sales have been made, while the offerings are plentiful. The consumptive demand is sufficient to prevent any glut in the market. At this writing indications point to higher prices in the near future.

Louisville.

LOUISVILLE, KY., June 8, 1891.

Pig Iron.—There has been no change in prices; Gray Forge for long deliveries selling at $10.25, with opportunities arising to buy for prompt shipment at $10, cars Birmingham, though no large blocks. The leading companies are heavily sold; one of the largest reports having orders booked for 73,000 tons, and a number of others in proportion to their capacity have sold an equal amount. Car companies are beginning to purchase more freely, and state that in making bids for furnishing cars to-day they are asking more than was named 30 days since, and sales are being effected, though no large transactions have been reported. The feeling is that the coming 30 days will show increased demand for cars at higher prices than have been ruling, and that the long continued policy of not buying or repairing cars on the part of railroads will change to increased activity, owing to the heavy demand to move the crops, and that all car companies will have until fall what business they can turn out. We quote for cash, f.o.b. cars Louisville, Ky.:

Southern Coke, No. 1 Foundry	$14.50 @ $15.00
Southern Coke, No. 2 Foundry	13.75 @ 14.25
Southern Coke, No. 3 Foundry	13.25 @ 13.75
Southern Coke, Gray Forge	12.75 @ 13.25
Southern Charcoal, No. 1 Foundry	16.00 @ 17.00
Southern Car Wheel	17.00 @ 20.00

Cleveland.

CLEVELAND, June 8, 1891.

Iron Ore.—A large amount of Ore has been sold during the past week. The sales from the Minnesota mines have been extensive. Nearly all of the high-grade Specular and Magnetic Ores to be mined this year have been let go at prices equivalent to $5.50, f.o.b. cars Cleveland. Much of this Ore goes east of the Alleghenies. The Carnegies' purchases, reported exclusively in last week's *Iron Age*, seem to amount to about 1,150,000 tons, and were fully covered in last week's reports. The sales of new Ore to date are in excess of 3,000,000 tons, but nothing indicating this could be gleaned from a visit to the Iron-Ore quarters of the city. Only a few carloads of Ore per day are being sent to the furnaces and the Ore handlers are idle. Vessels arriving here several days ago with consignments of Ore are still anchored outside in the breakwater unable to unload. Quotations are as follows:

No. 1 Specular and Magnetic Ores, Bessemer quality	$5.25 @ $5.50
No. 1 Specular and Magnetic Ores, non-Bessemer quality	4.25 @ 4.50
Gogebic Ore, Bessemer quality	4.25 @ 4.50
Menominee Ore, Bessemer quality	4.25 @ 4.50
Menominee Ore, non-Bessemer quality	3.40 @ 3.60

Pig Iron.—The market is rather slow. Some buyers are asking for Mill Iron and others for No. 1 Foundry, but only scattering sales are reported. Desirable grades of Bessemer Iron seem quite scarce, and not much business is reported. It is reported that several more furnaces will shut up during the coming week.

Nails.—Prices are unchanged, but the demand is better. Steel Cut Nails bring $1.70 and Steel Wire Nails $2.10.

Manufactured Iron.—Business is only fairly good. Bar Iron is bringing 1.60¢ @ 1.65¢, with the mills fairly well occupied.

Old Rails.—The market is rather weak and prices are far from strong. We hear

of a sale or two at $22.75 @ $23, but lower figures migh tprevail for a large order.

(By Telegraph.)

There have been heavy sales of Ore this week at the same figures announced in the *Iron Age's* quotations. We hear of big purchases of high-grade non Bessemers at $4 for Eastern delivery. The strike of the Ore handlers is believed to be over to-day, and the dozen vessels that have been anchored outside for ten days are moving up to the docks to discharge their cargoes. The total sales of new Ore to date are estimated at 2,700,000 tons; the prospective output of Bessemers seems almost sold up.

Detroit.

WILLIAM F. JARVIS & Co., Detroit, Mich., under date June 8, say: The market for the past week showed no change from our report of a week ago. Several inquiries for round lots of Southern and Ohio Irons have been received and a number of smaller sales made. Prices for these grades of metal remain firm, although there have been no advances made. Some good-sized orders for Lake Superior Charcoal have been taken at figures that have ruled for the last few weeks, and inquiries for a considerable tonnage, covering in some cases a whole season's supply, were received, which no doubt will result in still larger sales during the coming week, showing, as stated in our last week's report, that buyers are becoming convinced that the market can go no lower and that the present is as favorable a time to buy as they will have during the year. We repeat quotations:

Lake Superior Charcoal, all numbers	$18.00 @ $18.50
Lake Superior Coke, Bessemer	18.00 @ 18.50
Ohio Blackband (40 per cent.)	18.00 @ 18.50
Lake Superior Coke Foundry, all ore	18.00 @ 18.50
Southern No. 1	16.25 @ 16.50
Southern Gray Forge	14.00 @ 14.50
Jackson County (Ohio) Silvery	18.25 @ 18.75

New York.

Office of *The Iron Age*, 96-102 Reade street,
NEW YORK, June 10, 1891.

Nearly all lines in this market are exceptionally quiet, transactions being limited to urgent immediate requirements. Business men are beginning to consider carefully the predictions of a tight money market toward the fall months, and some concerns are deliberately adopting the policy of restricting their business to those whose credit is above all suspicion.

American Pig.—As indicative of the outlook for the balance of the year, we may note that one mill in this vicinity has been able to place its requirements for the second half of the year of Forge Iron at the same price for which the first six months' supply was purchased, the price being under $15, delivered. From the South come reports of concessions. We print elsewhere our usual monthly blast furnace statement, which shows the expected marked increase in the output west of the Allegheny Mountains. Northern brands are quoted at $16.75 @ $18 for No. 1; $16 @ $16.50 for No. 2, and $14 @ $14.50 for Gray Forge. Southern Irons sell at $16.25 @ $17.25 for No. 1; $15.50 @ $16.25 for No. 2; $15.75 @ $16.50 for No. 1 Soft, and $14 @ $14.50 for Gray Forge.

Spiegeleisen and Ferromanganese.—The Spiegeleisen market is dull, and no improvement is expected in the near future, since the majority of the Rail mills make all they require when running moderately full, and since the only two concerns which do not make Spiegeleisen in quantity are supplied for some time to come. Ferromanganese is dull at $64 @ $65 for 80 %.

Billets and Rods.—An inquiry for a moderate quantity of foreign Billets for re-export has developed the fact that the leading German mills making standard basic stock are unable to promise August and September deliveries. The only concern which named a price asked £5, which is considerably above buyers' views in this market. On Rods a small order for foreign material developed a similar state of affairs, £6 being the price asked.

Steel Rails.—Aside from a moderate run of small orders, nothing has been done by the Eastern mills, who continue to quote $30.75 @ $31 at tidewater.

Rail Fastenings.—We continue to quote Fish Plates 1.70¢ @ 1.75¢; Bolts, 2.60¢ @ 2.65¢, and Spikes 1.90¢ @ 1.95¢, delivered.

Manufactured Iron and Steel.—An increase in the number of men working has led to a somewhat larger local consumption of Structural material. No contracts of any magnitude have been placed, nor is there any elevated work of consequence in the market for the near future. A mill in the vicinity of Philadelphia has taken an order for 4500 tons of Plates, and a moderate amount of boiler work is on the market here. We quote Angles, 1.95¢ @ 2.10¢; Sheared Plates, 1.95¢ @ 2.25¢; Tees, 2.45¢ @ 2.75¢, and Beams and Channels, 3.1¢, on dock. Steel Plates are 2¢ @ 2.15¢ for Tank, 2.3¢ @ 2.6¢ for Shell, and 2.5¢ @ 2.7¢ for Flange, on dock. Bars are 1.7¢ @ 1.9¢, on dock.

Warrant Stocks.—The American Pig-Iron Storage Warrant Company report as follows:

	Tons.
Stock in yard, May 5, 1891	51,200
Put in yard for 35 days ending June 9, 1891	900
Total	52,100
Withdrawn 35 days ending June 9, 1891	1,900
Net stock in yard, June 9, 1891	50,200

Metal Market.

Copper.—It is understood that during the past three or four weeks about 10,000 tons of Lake Superior Copper have been sold for export at 12¼¢ @ 12¾¢. One company is credited with having placed 7000 tons and another the balance. While officially confirmed in part only, it would appear that the report is founded on fact, and that a burdensome surplus is taken from producers' hands. This movement, along with the suspension of work at the Anaconda mines, which will likely continue until September, gives the market a certain measure of support, and prompts sellers to harbor the idea that better prices are likely to prevail in the near future. It is stated that some contracts with home consumers have been made at 13¼¢ @ 13½¢ for future deliveries, but cheap lots do not appear to be all out of the way at this writing. In any event 100,000 lb or more of Lake Ingot have been sold at 12⅞¢ within a few days for prompt delivery, and there appears to be some left that may be had at 13¢. Holders of Arizona Ingot are asking 12¾¢, but on actual sale 12½¢ @ 12⅝¢ has been reached this week, and there are yet some sellers at the last-named price. Casting Copper is apparently the firmest of anything on the list, gaining, as it does, more or less support from the recent heavy sales of Matte at stiff prices in the European market. For good brands 11¾¢ is now named as being a close price.

Pig Tin.—Under the influence of a further rise in the London market and firm attitude of local holders prices for Pig Tin for prompt delivery have undergone a further advance of about ¼¢ ₱ lb, and August and later deliveries have ruled slightly higher also. Speculation at the higher level of prices has been spiritless, however, and the trade movement has not exceeded ordinary bounds. At present there is a hesitant feeling, prompted no doubt by the comparatively high prices ruling. Prompt and current month deliveries have been sold at 21¢, net cash, and smaller quantities out of store brought 20⅛¢ and upward. Wednesday the market was weaker under the influence of lower cables from London, sellers' option this month going at 20¼¢ @ 20.80¢, against 21⅛¢ paid on Saturday for 100 tons, buyers' option. There were sellers at 20.80¢ for July and August delivery.

Pig Lead.—During the past week about 1000 tons have been taken, chiefly by consumers, at 4.45¢ @ 4⅛¢ here, in round lots, and up to 4.55¢ was realized for single carloads. Additional purchases were made in the West at corresponding prices. This buying appears to have satisfied consumers' wants in a great measure, and, while the offering is more or less reserved at the moment, it would appear that 4.40¢ is not readily obtained. The close of the week, indeed, finds the market rather quiet and apparently a shade easier, 4.40¢ having been accepted for about 100 tons.

Spelter.—In this article there has been merely a routine movement here, and the position of the market is precisely the same as it was a week ago. Western is quoted at 4.90¢ @ 5¢, according to brand and delivery.

Antimony.—Prices have undergone a further sharp decline, and the lower cost has led to freer buying. Hallett's quoted at 13¢, LX at 13½¢ @ 14¢ and Cookson's at 14¼¢, in wholesale quantities.

Tin Plate.—Operations have been of merely fair volume, and the market is without distinctively new feature. Stocks here are large, all told, but well under control. The assortment, however, is not all that could be desired, some varieties of Plates being rather scarce. Quotations for large lots on the spot are as follows: Coke Tins—Penlan grade, IC, 14 x 20, $5.30 @ $5.35; J. B. grade, do., $5.40 @ $5.45; Bessemer do., $5.35 @ $5.40; Siemens Steel, $5.50 @ $5.55. Stamping Plates—Bessemer Steel, Coke finish, IC basis, $5.75 @ $5.80; Siemens Steel, IC basis, $5.90 @ $6; IX basis, $6.95 @ $7. IC Charcoals—Melyn grade, $6.30 @ $6.35; for each additional X add $1.50; Allaway grade, $5.90 @ $5.95; Grange grade, $6 @ $6.05; for each additional X add $1. Charcoal Ternes—Worcester, 14 x 20, $5.50; 20 x 28, $11; M. F., 14 x 20, $7.40 @ $7.50; do., 20 x 28, $15; Dean, 14 x 20, $5.15; do., 20 x 28, $10.25; D. R. D. grade, 14 x 20, $4.85; do., 20 x 28, $9.80 @ $9 85; Mansel, 14 x 20, $5; do., 20 x 28, $9.90; Alyn, 14 x 20, $5.10; do., 20 x 28, $10; Dyffryn, 14 x 20, scarce; do., 20 x 28, $10.50. Wasters—S. T. P. grade, 14 x 20, $4.75; do., 20 x 28, $9.30; Abercarne grade, 14 x 20, $4.70; do., 20 x 28, $9.25.

Coal Market.

There are large quantities of Anthracite Coal moving out from retail yards, bought at May prices and little if any has been sold at the 15¢ advance announced at the last agents' meeting. Steam sizes are scarce, Pea selling at $2.40 @ $2.50, alongside; Buckwheat $1.75 @ $1 85, alongside; Lehigh Broken and Egg are scarce. The few sales reported are at the new figures, about $4, alongside. Speaking of actual prices, although no cuts are heard of among the companies, Free Burning Stove is selling at $3.75 @ $3.85; Chestnut $3.50 @ $3.60, alongside.

British Iron and Metal Markets.

[*Special Cable Dispatch to The Iron Age.*]

LONDON, WEDNESDAY, June 10, 1891.

The market for Pig-Iron warrants has been unsettled and irregular. Scotch sold down 6/ to 48/ and Cleveland went to 39/, while Hematites moved up to 50/. There has been considerable excitement during the week, but the squeeze in Scotch warrants is believed to be over and fresh business is light. Buyers hold aloof, as though awaiting lower prices, and the impression that the London syndicate are letting prices down with a view to checking a heavy increase in warrant stores also has some bearing. The stock in Connal's stores is now 515,000 tons Scotch and 128,000 tons Cleveland. Exports last month were only 86,000 tons, against 136,000 tons in May, 1889. To-day's transactions in warrants were at 48/ @ 48/6 for Scotch, 39/9 @ 40/3 for Cleveland, and 49/6 @ 49/9 for Hematite.

Pig Tin has ruled firm throughout the week, and while prompts have commanded a premium over futures at times, a considerable outside interest in the latter has been attracted by the further reduction in stocks here.

Prices for Copper have ruled irregular, and there has been a large turnover on speculative account during the week in addition to free buying by consumers.

In Tin Plate there has been a fair business, chiefly Bessemers and Ternes, for quick delivery. There is some inquiry for forward deliveries, but difficulty in securing shipping accommodations to the United States restricts business. Freight rates are up to 45/ ₱ ton. The stock at shipping ports is estimated at 209,000 boxes, as against 505,000 boxes a year ago. Total shipments last month were 62,000 tons, of which 55,000 tons went to the United States. The movement in May, 1890, was 37,000 tons and 25,000 tons respectively.

Scotch Pig Iron.—There has been more movement in makers' brands and prices are steadier.

No. 1 Coltness,	f.o.b.	Glasgow	62/
No. 1 Summerlee,	"	"	60/
No. 1 Gartsherrie,	"	"	60/
No. 1 Langloan,	"	"	61/6
No. 1 Carnbroe,	"	"	59/
No. 1 Shotts	"	at Leith	61/6
No. 1 Glengarnock,	"	Ardrossan	59/6
No. 1 Dalmellington,	"	"	55/
No. 1 Eglinton,	"	"	52/6

Steamer freights, Glasgow to New York, 2/; Liverpool to New York, 10/.

Cleveland Pig.—Demand shows little improvement and prices are irregular. Makers' quote 39/9 for No. 3 Middlesborough, f.o.b.

Bessemer Pig.—Trade has been slow and the market is weaker, with 50/ quoted for West Coast brands, Nos. 1, 2 and 3, f.o.b. shipping port.

Spiegeleisen.—The market is quiet, but steady, with English 20 % quoted at 95/ @ 97/6, f.o.b. shipping port.

Steel Rails.—Prices remain as before, with the market steady, but quiet. Heavy sections quoted £4. 10/ @ £4. 12/6, and light sections £5 @ £6, f.o.b. at N. W. England shipping point.

Steel Blooms.—Trade is slow and prices are without change. Makers ask £4. 5/ for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—The market remains quiet and is without change. Bessemer, 2½ x 2½ inches, quoted at £4. 10/, f.o.b. at N. W. England shipping point.

Steel Slabs.—Business still light and the demand without improvement. Bessemer quoted at £4. 10/, f.o.b. at N. W. England shipping point.

Old Iron Rails.—Buyers and sellers are wide apart and little business passes. Tees quoted at £2. 15/ @ £2. 17/6 and Double Heads £3 @ £3. 2/6, f.o.b.

Scrap Iron.—A slow market, with sellers asking former prices. Heavy Wrought quoted at £2. 10/, f.o.b.

Crop Ends.—The market dull and wholly unchanged. Bessemer quoted at £2. 15/ @ £2. 17/6, f.o.b.

Tin Plate.—Rather more business passing, but prices irregular. We quote, f.o.b. Liverpool:

IC Charcoal, Alloway grade	17/6 @ 17/9
IC Bessemer Steel, Coke finish	15/ @ 15/3
IC Siemens " " "	15/3 @ 15/6
IC Coke, B. V. grade	14/9 @ 15/
Charcoal Terne, Dean grade	15/6 @ ...

Manufactured Iron.—There is no improvement in the demand, and prices still favor the buyer. We quote, f.o.b. Liverpool:

	£	s.	d.		£	s.	d.
Staff. Marked Bars				@	8	10	0
" Common "	6	5	0	@	6	7	6
Staff. Bl'k Sheet, singles				@	6	15	0
Welsh Bars (f.o.b. Wales)	5	12	6	@	5	15	0

Tin.—The offering more liberal to-day and prices rather lower. Straits quoted at £93. 7/6 @ £93. 10/, spot, and £93. 5/ for three months' futures.

Copper.—The movement smaller to-day and prices irregular. Merchant Bars quoted at £55. 2/6, spot, and £55. 15/ @ £56, three months' futures. Best Selected, £59.

Lead.—There has been more doing and the market is firmer at £12. 12/6 @ £12. 15/ for Soft Spanish.

Spelter.—Under better demand the market is firmer at £23. 10/ for ordinary Silesian.

Financial.

A conference of bankers in this city last week with Secretary Foster had express reference to the extension of the 4½ per cent. bonds due September 1. The result was the passage of a resolution approving of an extension at two per cent. To inspire public confidence the Secretary stated that under existing laws he possessed ample authority to protect the credit of the Government. Thus it was within his power to sell at any time, if it should be necessary for the maintenance of the bullion fund, the large amount of bonds which the Treasury was empowered to sell, for the purpose of redemption of United States notes, under the Resumption act. This action is suggested by the depleted condition of the resources, which were seldom so low as now at this season of the year. The withdrawal of $3,000,000 from the national bank depositories, under the recent call of Secretary Foster, will doubtless enable the Government to get through the month without a deficit. It would relieve the situation if it were possible to determine when exports of gold will cease. Thus far they have been largely offset by the receipts of gold from the interior. Naturally the most hopeful feature is the expected reflux when the wheat harvest shall move forward for consumption in Europe. The latest advices per cable are that the harvest throughout Western and Central Europe will be late and of poor quality. The Russian harvest, in many of its important districts, will be a failure. The crops of Western and Central Europe being bad and late, the price of wheat will be high. Happily the drought in the grain-growing regions of the Northwest is broken. A Chicago letter says very little winter wheat will be cut before June 25.

The stock market was irregular and lower, and at times unsettled. On Thursday the announcement that the Rock Island would pay only one-half of 1 per cent. dividend for the current quarter caused a sharp drop in that property, which had unsettling effect upon the whole list. On Friday the market yielded to the pressure of free sales, and Saturday was dull. The bond market was particularly so, even the first-class issues selling on a low basis of value. On Monday the noteworthy feature was the weakness of foreign exchange. Nevertheless, there was talk of further large shipments of gold.

United States bonds are quoted as follows:

U. S. 4½s, 1891, registered	100
U. S. 4½s, 1891, coupon	100
U. S. 4s, 1907, registered	118½
U. S. 4s, 1907, coupon	118½
U. S. currency 6s, 1895	109

Sales of bank stock—50 shares America at 210½ and 110 Western National at 99½ to 100.

The weekly bank statement showed a decrease of $841,575 in legal reserve. Loans contracted $2,848,500. Specie decreased $1,207,800 and legal tenders decreased $440,000. The loan market was much firmer. Dealings in commercial paper were restricted by the recent failures of mercantile houses, banks and trust companies holding out of the market as a general thing. At the close 6 % was freely bid for all periods. Borrowers were obliged to sign gold notes. The market was not affected by the failure of Russell & Co. of China, except that it made those who are conservative feel a little more so. A London special says the London Joint Stock, Scotch and other banks, have resolved to approve the efforts of the six banks now combining with the Bank of England to support that bank's action in retaining the gold already acquired.

In the markets for general merchandise there is a more quiet tone, with much less of a speculative spirit, attributed mainly to the uncertain foreign financial position. Breadstuffs are very easy, wheat weaker and slow. The shortage of wheat in France is placed as high as 120,000,000 bushels. In the grocery market there is a material decline in the price of coffee. The demand for sugars is disappointing and prices of both raw and refined are lower. The dry goods market is in good shape. There was a satisfactory trade in fall specialties. The prospects of price changes favorable to buyers seemed more remote, and in woolen articles the tendency was upward. In the table oil cloth trade there was a new phase. The combination which had been annually renewed for about ten years fell to pieces and there was immediate independent action and cutting of prices, the decline being from $2.25 to $1.75 per roll. Collections continue good except in some parts of the South.

The annual meeting of the Consolidated Exchange heard the report of President Wilson, showing entire success in the department devoted to railroad stocks, the sales aggregating 75,806,990 shares, whereas mining stocks have dwindled to insignificant proportions and the oil business has collapsed. Sales of petroleum dropped to 66,000,000 barrels against 287,000,000 the previous year.

New York Metal Exchange.

The following sales are reported:

THURSDAY, June 4.

30 tons Tin, spot.....20.70¢
10 tons Tin, spot.....20.75¢
10 tons Tin, June.....20.00¢
10 tons Tin, June.....20.85¢
90 tons Tin, June.....20.90¢
60 tons Tin, June.....20.95¢

SATURDAY, June 6.

100 tons Tin, June.....21.25¢
(Buyer's option, one day's notice.)

MONDAY, June 8.

10 tons Tin, June.....21.00¢
10 tons Tin, each, July to December.....20.70¢

TUESDAY, June 9.

10 tons Tin, August.....20.75¢

HARDWARE.

Condition of Trade.

MANUFACTURERS, through their representatives, generally refer to trade as being at present of only moderate volume, their orders being confined principally to goods required to complete jobbers' assortments. Our advices indicate the fact that the jobbing trade through the country are doing a pretty satisfactory business, and from some sections the reports indicate a very gratifying activity. In some quarters, however, trade is referred to as rather quiet. A marked feature of the situation is the confidence with which the fall trade is regarded, especially in view of the abundant crops which are expected. In the matter of prices the market shows but little change. While the tone is not strong, manufacturers are generally pursuing a conservative course and refraining from breaking prices. There is still some stringency in financial matters, and collections are rather sluggish.

St. Louis.

(*By Telegraph.*)

Hardware.—The week under review has been a quiet one so far as the Hardware trade is concerned. The excessive rains in the country, while they have had a beneficial effect on the crops, have retarded business to some extent. The present month, however, will likely prove a satisfactory one, as the stocks on hand are unusually light and will shortly have to be replenished. There are no special changes in prices to note. Wire Nails do not show much improvement, although they are held at slightly higher prices today than one week ago. Complaints are heard regarding collections.

Chicago.

(*By Telegraph.*)

A very large business is reported by jobbers of Heavy Hardware, whose trade so far this month is in excess of the same period of last year. Their representatives in the Dakotas and in Kansas and Nebraska have been particularly favored with good orders, showing the improved feeling existing there as a consequence of the excellent crop prospects. The business in Wagon Stock, it is claimed, would have been even larger than it has been if the price of Wheels had not been pushed up to figures which the carriage and wagon builders deemed exorbitant, but the Wheel manufacturers are now more reasonable in their views, and an increased trade is anticipated. The demand for Iron and Steel continues unabated from the classes of consumers who depend upon the jobbers, and if the railroad companies should come into the market to any extent the facilities of the dealers would be severely taxed. The jobbers of Shelf Hardware are not disposed to complain of the volume of trade in that line, which they say is fairly good, but they could do a great deal more without being badly crowded. June trade shows a gain over that of May and the month promises to be the best of the year thus far. The trade in Stamped and Pieced Tinware has also improved very considerably of late, and the houses making a specialty of such goods are quite well satisfied with their trade, which bids fair to continue good until midsummer brings its customary quiet.

Notes on Prices.

Wire Nails.—The market continues in substantially the same condition as last week. While there is no improvement in prices to report, there is an evident feeling among manufacturers that they must get more for their goods. The state of the market, however, does not as yet permit this. If there should be, as some anticipate, an early fall trade, it would undoubtedly improve the tone of the market. During the past month the volume of trade in this line has been satisfactory, the mills as a rule being well occupied on orders, and it is understood that some of the large jobbers have covered their requirements for the next month or two. A large amount of goods is still being purchased in the regular course of business, but the capacity of the mills is such that most of them are in a position to accept further orders and execute them with reasonable promptness. The price remains as before at $1.95 to $2 for carload lots at mill. Small lots from store are held at $2.20 to $2.30.

Chicago, by Telegraph.—A moderate amount of inquiry is reported, but a heavy trade is expected by manufacturers this month and next. They quote from $2 to $2.05, Chicago, for factory lots and are not inclined to force trade at present. Jobbers quote $2.15 from stock, with the usual reduction for carloads.

Cut Nails.—The aggregate of trade during the past week or ten days has been large, considerable quantities of Steel and Iron Nails having been purchased by the trade, who recognize existing prices as low. There is not, however, sufficient confidence that an advance is soon to be expected to induce buyers to place orders in excess of their requirements for the next month or two. $1.55 at mill, with concessions in exceptional cases, may be regarded as a fair quotation for round lots. Small lots from store in New York are held at $1.75 to $1.80, and carload lots at dock $1.65 to $1.70.

Chicago, by Telegraph.—Steel Nails appear to be a little more active than Wire Nails at the moment, but business is by no means in satisfactory shape. Competition is brisk among manufacturers who can reach this market and prices are as low as ever. The open quotation on factory lots is $1.70, Chicago, for a 30 cent average, but this is shaded by some makers who are apparently very anxious for business. Prices have now become so close that ¼ cent per keg often influences a contract. Jobbers quote $1.75 to $1.80 from stocks.

Barb Wire.—There is rather more promptness on the part of manufacturers in shipping goods. The demand is fair, and prices, it is thought, generally maintained. There are, however, rumors of some irregularities. Prices continue as before on the basis of $3.50 for Four-Point Galvanized and $2.95 for Painted, with the regular abatement of 10 cents for carload lots and 5 cents for jobbers and railroads; terms 60 days, or 2 per cent. discount for cash in ten days, with delivery at leading points.

Chicago, by Telegraph.—A mysterious weakness has become apparent and reports of shading are in circulation, much to the discomfort of manufacturers, who report an excellent demand from all quarters. One large factory has been disabled by fire and its business has gone into the hands of its neighbors, so that competition is less than usual, and, therefore, prices should be firmer. Nevertheless, an element of weakness exists somewhere and prices are not so firmly maintained as they have been. Jobbers continue to quote $2.80 for Painted in any quantity.

Shot.—An advance in the price of Shot was made by the associated manufacturers June 4. The following are the present prices for ton lots, less than ton lots the price being 5 cents per 25-pound bag advance on these prices. Terms, net, 30 days, or 2 per cent. discount for cash in ten days from date of bill:

Drop Shot up to BB, 25-pound bag	$1.37
" " " 5 " "	.35
" BB and larger, 25-pound bag	1.62
" " " 5 " "	.40
Buck and Chilled, 25-pound bag	1.62
" " 5 " "	.40
Dust Shot, 25-pound bag	2.00
" 5 " "	.45

Wrought-Iron Pipe.—A meeting of the manufacturers was held June 3, but the only change in price was in some of the larger sizes of Boiler Tubes. The present discounts are as follows :

Wrought-Iron Pipe:	Discount. Per cent.
Butt, black	55
" galvanized	45
Lap, black	65
" galvanized	52½
Boiler tubes :	
All sizes up to 2¾ inch inclusive	55
" " 3 to 6 " "	65
Seven inch and upwards	55
Casing	55

The market may be referred to as having a firmer tone than has characterized it for some time, with less of irregularity than has recently prevailed. It is thought that as a general rule prices are well maintained by the manufacturers, with some cutting, however, on the part of jobbers.

Carriage Bolts.—The Common Carriage Bolt Association held a meeting last

week, at which prices were reaffirmed for the next 30 days. There was some expectation that an advance might be made, but in view of the condition of the market and for other reasons it was deemed unadvisable to do so.

Screws.—There does not appear to be that uniformity in the prices of Screws which for some time has characterized the market, and it is understood that some of the associated manufacturers are more disposed than heretofore to meet some of the quotations made by outside manufacturers.

Stove Boards.—The market is in the buyer's favor, manufacturers apparently not having decided fully as to the course they will adopt. Prices are rather unsteady and without uniformity.

Cutlery.—A. J. Jordan, St. Louis, Mo., has adopted a new list which, however, has not as yet been issued.

Cordage.—There is but little change to be noted in the situation as described in our last issue. Although there has been no official reduction made by the National Cordage Company in their prices, as adopted two or three weeks ago, there has still been a slight giving away in the market as quotations made by outside parties have in some instances been met by manufacturers connected with the National Cordage Company. The condition of the market is regarded by some careful observers as likely to justify the placing of orders, in view of the probability that prices will be higher before long.

Carpet Stretchers.—The Stand-Up Carpet Stretcher, manufactured by L. Hinkle, Indianapolis, Ind., is sold at $9 per dozen to the trade.

Glass.—The demand for Glass is improving slowly, but the impression prevails that the requirements for the season will not be large. The manufacturers complain that the prices received by them for Glass are not as large as they are entitled to in view of the cost of production. Foreign Glass is coming to this country in considerable quantities, and at its present price is likely to prove quite a competitor in the market. Business in Plate Glass is reported to be up with the quantity used in former years, though it is divided among a larger number of houses. It is reported from Pittsburgh that at a meeting of the Fruit Jar manufacturers an increase in the price of Fruit Jars was decided upon, the demand for Jars being large and the factories being full of orders. Prices on Glass remain unchanged, as follows: American Window Glass, for carloads, 80 and 10 per cent. discount; less than car lots, 80 and 5 per cent. discount; French Window Glass, 75 and 10 and 5 per cent. discount, with an additional 5 per cent. discount when 50 boxes are ordered and taken in any calendar month. American Plate is held at discount 50, 10 and 5 per cent., and Imported Plate at discount 60 per cent.

Trade Items.

THE FACTORY of the Chicago Spring Butt Company, Chicago, Ill., was partially burned out on the 30th ult. The company are, however, rapidly adjusting matters and are now probably in a position to fill orders. They hope that their customers will overlook any delay there may be in shipments.

THE HARDWARE ESTABLISHMENT of McLane & Schanck, Linesville, Pa., was completely destroyed by fire May 16. The fire originated in the cellar in some unaccountable way, and not, as was reported in the newspapers, from the explosion of gasoline, the latter not being kept on the premises. The firm are now established in new quarters with a new stock of goods and are doing their usual business. They expect to erect a three-story brick block on the burned site in the near future.

THE FIRM OF Samuel R. Marshall & Co., dealers in Hardware, Charleston, S. C., was dissolved by limitation on May 31. A new partnership has been formed consisting of Julius I. Westcoat, Benjamin Greig, John V. McNamee and Paul W. Sanders, who will continue the business at the old stand under the firm name of Marshall, Westcoat & Co., Mr. Marshall permitting the use of his name.

HORNBY & CARMAN, Valentine, Neb., advise us that they have purchased the stock of Hardware formerly carried by the Snyder-Robinson Hardware Company of Ogden, Utah. They state that the intimation in a recent issue to the effect that they have a branch establishment at Provo City, Utah, is without foundation, and that they have but two stores, one in Valentine, Neb., and the other at Ogden, Utah, which, as noted above, has recently been purchased.

L. HINKLE, Indianapolis, Ind., is offering the trade the Stand Up Carpet Stretcher. As the name signifies, the Stretcher is used while the operator is standing. The Stretcher is referred to as saving the fingers, saving the knees, saving the back and saving the bones of the operator. These goods are sold direct to retail dealers, and, we are advised, are now sold by about 13,000 dealers.

A DECISION has been rendered in the Circuit Court of the United States, Eastern District of Pennsylvania, in favor of the Enterprise Mfg. Company, in the suits brought by them for infringement of patent for improvements in Meat Choppers.

ON MAY 29 the boiler in the sawmill of McCord Bros., one of whom is S. B. McCord, dealer in Hardware, Baker City, Ore., burst, and was hurled some 200 feet. As the employees were at dinner no one was hurt.

PARRY MFG. COMPANY, Indianapolis, Ind., are directing special attention to the Parry Gear, as used on their Road Wagons. The front axle is cranked forward, and the rear axle is cranked backward, the springs being hung where the axles would be, were they in a straight line. The fifth wheel is referred to as novel, strong, dust and mud proof. This is alluded to as a short turning gear, and is spoken of as being a feature much in its favor, while its simplicity makes it desirable.

W. E. LAPE, 235 Walton street, Syracuse, N. Y., announces that he has secured the right to manufacture and sell the Rex Lawn Mower and the Crescent Bench Hook. Mr. Lape states that he possesses every facility for the manufacture of these and such other specialties as will be added from time to time, and refers to the utility and excellence of the above-mentioned articles.

DAVIES & JUNOD, Williamsport, Pa., have improved their Extension Ladders by the addition of an Automatic Hook, and Crank and Windlass. They refer to the high grade of selected pine and bass used in the construction of these Ladders. They are made in double extensions of 16, 18 and 20 foot sections.

THE HARDWARE FIRM of Shurter & Briggs of Poughkeepsie, N. Y., have removed their business to the store 268 Main street, and now have one of the handsomest stores in the city. The firm of Shurter & Briggs have done business since 1867, having succeeded George S. Dennis. The firm now occupies the whole building, comprising three floors, each 22 x 85 feet. The place is completely stocked with goods for the stove and tinning trades.

A FIRE BROKE OUT in the machine shop and rolling mill of the Cleveland Hardware Company last Saturday morning, which resulted in a loss of $150,000, fully covered by insurance. The fire is believed to have started from sparks thrown out by the numerous forges scattered about the machine shop. The rolling mill and shop, which were under one roof, were a total loss. The building destroyed was of frame, 300 feet long and 150 feet wide, and contained all the machinery and castings for making small wagon castings and other small Hardware, including steel tires for car wheels. These were a total loss, but fortunately the company's warehouse was saved from the flames, and a duplicate plant kept in readiness for such emergencies will be placed in the works at once and business will be resumed as soon as practicable. The burned buildings will be replaced at once.

THE FOLLOWING wholesale Hardware dealers of Pittsburgh have signed an agreement to close their places of business during the months of June, July and August at 5 p. m., excepting Saturday, and on that day at 3 p. m.: Joseph Woodwell & Co., Wolff, Lane & Co., Wharton, Bakewell & Co., Logan, Gregg & Co., Bindley Hardware Company, James C. Lindsay & Co.

OUR PHILADELPHIA REPRESENTATIVE advises us that business at the extensive Saw and Tool works of Henry Disston & Sons is beginning to show signs of increased activity. In the File department they are turning out over 1000 dozens per day, and are still a little behind with their orders. The Saw department has been comparatively quiet for some time past, but is again picking up, and is likely to assume larger proportions than ever during the fall months. Samuel Disston also took occasion during an interview to deny the rumor that the Harvey W. Peace Company works were to be closed, and remarked that they would run the establishment as long as it paid them to do so, and for the present business was moving satisfactorily.

ANNOUNCEMENT IS MADE BY "The Syndicate of Judgment Creditors of the American Machine Company, S. P. M. Tasker, treasurer," that they bought in at sheriff's sale on June 5 the plant, including stock, tools, fixtures, &c., of the American Machine Company. It is the intention to reorganize at once, and in the meantime the business will be carried on under the name of "The Syndicate of Judgment Creditors of the American Machine Company." A. C. Albrecht and Emil P. Albrecht, who have been in the service of the American Machine Company, are continued under the present management. The attorney of the new organization is John Sparhawk, Jr., 400 Chestnut street, Philadelphia, from whom any information in regard to the enterprise can be procured.

UNDER DATE June 1, I. Bremer announces that he has purchased the entire property and business of the late Medford Fancy Goods Company, to which for ten years, as president and treasurer, he gave his personal and constant supervision. Mr. Bremer states that with abundant capital, enlarged facilities and an earnest purpose to maintain a high standard by furnishing goods of the most artistic design and finest finish he hopes not only to retain the patronage with which he has been favored, but to greatly increase it.

Screen Wire Stand.

WE ARE INDEBTED to "Hardware Charlie" for the accompanying illustrations and description of a Screen Wire Stand, which we take pleasure in presenting for the benefit of our readers. It consists of a wooden stand, with rollers on which the cloth is placed.

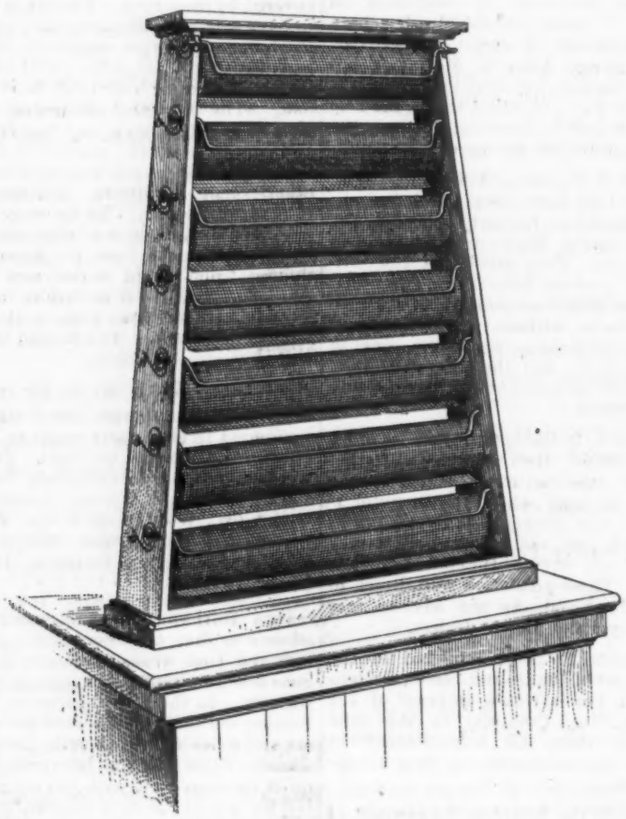


Fig. 1.—Screen Wire Stand.

A bent rod, held in place by a spring, acts as a tension to prevent the Screen Wire from unrolling faster than is required. The entire hight of the stand, Fig. 1, is 52 inches, being 39 inches wide at the bottom and 27 inches wide at the top. The upright pieces are 6 inches wide at the top and 8½ inches at the bottom. This will hold seven rolls of Screen Wire, one each of 24, 26, 28, 30,

Fig. 2.—Roller.

32, 34 and 36 inches. The wood rolls, Fig. 2, are all 1¾ inches in diameter, and must be the same lengths as the Screen Wire for which they are intended. An iron pin is driven in each end of the roller on which to revolve. Round wrought-iron rods, ⅜ inch in diameter, are bent in

Fig. 3.—Tension Rod.

shape, Fig. 3, and a small hole punched in the longest end from the curve, 1½ inches from the end, and are used as tension rods. The rods are to be the following lengths after bending: 28, 29½, 31½, 33½, 35½, 37½ and 39½ inches. No. 9 brass spring wire is cut in lengths of 12 inches and formed into springs as shown in Fig. 4. The coiled end of the spring is passed through the hole in the tension rod; the spring being held taut by the other end resting on a screw eye in the upright. The Screen Wire is arranged on the rollers so as to unroll from the under side, the stand being fastened across the end of the counter, to be as much as possible out of the way. It is intended for use in retail stores, and for simplicity, adaptability and cheapness, as well as for the small amount of room it occupies, cannot fail to commend itself to all as practical. We have no doubt that

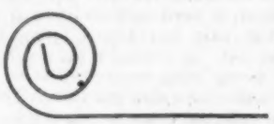


Fig. 4.—Wire Spring.

a large number of our readers will forthwith build one of these stands for their own use.

Credit System.

REFERRING to this matter a correspondent, whose views on different trade questions we have had the pleasure of laying before our readers, thus discusses the question of credit in some of its different aspects and relations:

The credit system subject has been discussed to seeming exhaustion, and thus to a demonstration that it is an inexhaustible subject. It commences with a 5 hundredweight charge on the merchant's book, and ends with the bonded indebtedness of a nation. As things go, it has its origin in corelated causes and in kindred designs, resulting in corelative fortune and misfortune. As we consider it commercially, we consider it in our special line, Hardware.

We assume that credit is offered as often as it is asked for—50 to 50. It is offered for one of two reasons, design or necessity. It is asked for for one of two reasons, necessity or design. The person offering it with a design expects to become a beneficiary, in most instances legitimately so. The person who offers it from necessity does so defensively. The person who asks for it from necessity mistakes convenience for necessity, and demonstrates the error of his judgment. The person who asks for it designedly seeks to become a beneficiary, in the most instances illegitimately. All the purposes or necessities to be worked to ends logical, as the individuals have capacity, or conscientiousness, or both. The proper cultivation of the credit system begets the element cash, for its own displacement, as the improper cultivation of it displaces the cash necessary to its maintenance. The proper cultivation of the cash system begets a system of credit, as the improper cultivation begets a credit system. If the credit and cash systems are not interdependent, they at least result from each other; they are co-operative for good or otherwise.

Ages ago men loaned and borrowed, promised to pay and paid, borrowed and never repaid, promised to pay and never paid—this has been so from the beginning, to and including this generation; it will be so from this generation to and including the last one; it will ever be so; it is a condition in the economic relations of man. A man may practice for a lifetime a cash system—say, to the age of 60; he negatives his life's example when he retires from business by loaning the money he thus made to young men, his successors; he creates a debtor, and seeks the income of a loaning creditor.

In these economic relations there are many excellent purposes. Perverted they become commercially death-dealing instruments, sometimes boomerangs. It, therefore, is for each of us, and all, to constantly exercise, for the promotion of our mutual interests, the least comprehensive practice, with the finest discrimination, all vigilance as to whom we grant credit, and from whom we demand spot cash. Those lines of business that furnish merchandise for personal consumption should adhere closer to the cash system than any other, because, in the conversion and adaptation of such goods and material, no income or profit results excepting that that is incidental.

To whom to give credit, how much and when, can in a degree be likened to the practice of medicine. Almost each individual patient, upon a proper diagnosis, requires different medication. Diseases may be identical, yet temperaments and constitutions not alike vary the medical treatment. We should study well, so as to be able to form proper judgment as to the disease, and above all, know rightly the art of medication, for commercial medicine is as much an art as it is a science. We should learn to anticipate trouble by avoiding it, whenever we feel it an unpleasantness to decline credit to a doubtful applicant; we can avoid it, though we may dislike to do so, if as commercial healers we do not indulge possible patients in the food of too much credit, it makes them bilious. We should also avoid too much purging, when mild laxatives would be less weakening to the tightened system. In either event it may so disarrange the system that when demands are made upon the vitality it is so low that dissolution ensues in consequence of a mild strain. Neither should we dig inviting pits for others to drop in. The drop may produce a fracture, the healing of which may bring profitable fees, succeeded by a reaction, fatal to creditor or debtor, as the case may be. Where do we learn this art? Each one in his own school; circumstances and localities differ and do not permit a universal rule.

The Cost of Freight.

BY R. C. S.

IN READING in a recent issue, "Ethics of Competition" by the committee of the stove manufacturers, points are suggested that have a great bearing on making a standard price, by estimating the cost of manufacture and adding it to the cost of the raw material. Also upon the accurate method of computing the cost of goods delivered to the various distributing points, when the actual cost at the factory is known to the manufacturers. This knowledge is necessary in a mutually successful competition, both to the distributors and to the manufacturers themselves.

The question presents itself to the distributors, "Will the concessions offered by the more remote manufacturers be more to their advantage than the higher prices of the nearer market, with the advantage of low freight in its favor?"

In treating of this our attention is first called to the fact that freight is charged for by the pound, without reference to the cost of manufacture. Thus, for any two articles of the same weight, the freight will be the same from the same point, and just so much more from a more distant point as the freight classification and weight make it, without reference to their values. How can either the buyer or seller have any knowledge of this fact without a corresponding knowledge of weights?

On certain lines of heavy Hardware, I believe, freight allowances of so much per hundredweight are granted, either to equalize prices with other manufacturers or to give free delivery to large distributors at wholesale centers, which brings before the smaller distributors in smaller places these questions: "Are the prices from the nearer points better than the lower prices offered from the more distant points; or are those prices from various places that quote with freight allowances from factory closer than such a price delivered?"

The inability to decide results from the limited knowledge of weights. The imperfection of the present system consists in computing the cost of goods to the buyers, delivered in their store, by percentage on cost, when transportation is charged for by weight. The cost and weight have but little to do with each other, yet this fact is daily ignored.

The following may be taken as a fair example of some small classes of invoice; the larger the invoice the more complication:

4 dozen boxes Hung. Nails at 20	$0.80
1 Blacksmith Drill	3.00
4 dozen Chisels at $3.00	12.00
10 dozen X X X X Pocket Knives at $3.50	35.00
10 dozen Augers at $1.00	10.00
Total	$60.80

Freight: 75 pounds at 73 cents hundredweight equals 55 cents, which by percentage on the amount of invoice is not quite 1 per cent. Now, adding 1 per cent. to each item to find the delivered cost, we find the gross amount of each item as follows:

The first	$0.81	Amount of bill.	$60.80
second	3.03	Freight charges.	.55
third	12.12		
fourth.	35.35		
fifth	10.10		
Total	$61.41	Total	$61.35

According to this only 3 cents are allowed for freight on a heavy blacksmith Drill, while we allow 35 cents on about 5 or 6 pounds of Pocket Knives. Of course anyone may know that the freight on the Drill is too little, but, really, how much should it be?

Also, owing to this inaccuracy, the delivered costs may vary according to the nature of the package, while the prices at factory remain unchanged. Two Hardware stores, side by side, may pay exactly the same price for their goods, and the same freight rate per pound, yet after adding the same profit, they will offer their goods at different prices, according to the assortments in which the goods were purchased.

I would like to have the ideas of the more experienced upon this topic, and hope to see some good plan advanced through the columns of *The Iron Age*.

Trade Topics.

Postal Cards.—An experienced Hardware man in West Virginia, in a letter referring to the interest to the trade of information and suggestions concerning details of business methods, alludes to the use of postal cards in the following terms:

I would like a little light on the use and abuse of the postal card as viewed by the trade nowadays. I served my business apprenticeship under two well-known business men of the old school, and they had a decided aversion for the postal card, considering their use as not "good form," even if they contained all that was to be said. Have also had to listen to numerous complaints about the awkwardness of filing them with letter and note heads.

I would suggest that they be made of a better grade of paper than they now are. They are, in my judgment, a great convenience, and numerous forms could be printed on them that would carry out the suggestions of one of your correspondents with reference to economizing time. Would prefer a card of same size made of paper selected and printed to my own ideas, to which a 1 cent stamp could be attached, if this would not conflict with postal regulations.

Percentage.—We are in receipt of the following inquiries from a Western Hardwareman. They relate, it will be observed, to percentage, which has so prominent a place in the figuring of the Hardware business. Our correspondent's questions have a wide range and relate some of them to matters of a great deal of importance in the trade. We are glad to submit them to our readers and should be glad to have their opinion on the matters to which they relate:

1. How to find what per cent. is made on an article the cost and selling price being known?

2. Is the percentage made by the sale of an article the same per cent. as was added to the cost to make the selling price?

3. What general rule can be applied to answer questions like No. 2?

4. Is there any short method of figuring discounts?

5. Is a business considered a profitable one in which the expenses exceed 10 per cent. of the gross receipts per year?

6. What is considered a fair percentage on the gross sales to allow per year for uncollectable debts?

Price Book.—Referring to the different ways in which merchants can keep track of prices so as to be able to immediately determine from whom to order, taking advantage of best prices, &c., a Pennsylvania jobbing house describe their plan as follows:

We have an illustrated catalogue representing our stock. The writer does the buying and keeps a copy of this catalogue on his desk, with every quotation or purchase penciled in under each item, with date, &c. By this means we are able to take advantage of the best prices we have had on any item and can readily turn to it.

Spot Cash.—In reply to the inquiry which appeared in our last issue with reference to the force of this term, we have the following from a New York manufacturer:

We understand spot cash to mean payment for goods in actual cash (checks considered actual cash) on the day of their receipt. If we buy a bill of Steel for spot cash we wait until the Steel is received, when we verify the weight, and if correct promptly send check to seller on same day. We have never had our method questioned, and our common sense says it is correct.

Price-Lists, Circulars, &c.

CHICAGO WIRE GOODS COMPANY, 23 Lake street, Chicago: Illustrated catalogue for 1891 of standard Wire Goods manufactured by this company at Aurora, Ill. This is the first catalogue and price-list issued by the Chicago Wire Goods Company, who have succeeded to the business of the New Haven Wire Goods Company of New Haven, Conn. The new company have greatly increased facilities and present a much larger line of goods They call special attention to their patented New Haven Broiler, which has had a remarkable sale. The catalogue comprises 76 broad pages, covering an infinite variety of goods made of wire, such as Screw Eyes, Screw Hooks, Belt Hooks, Handrail Screws, Hammock Hooks, Pokers, Meat Hooks, Wrought-Steel Hooks and Staples, Broilers and Toasters, Kitchen Goods of almost every kind possible to be made of wire, Picture Easels, Traps, Horse and Ox Muzzles, &c. The company also present in this catalogue the Eagle Gas Stoves for cooking and heating, the new Aurora Wire Fencing and the King Rod Cutter for cutting wire of all sizes up to ⅜ inch. The publication is very creditable to the company, the illustrations and press work being well done, while the work is not crowded in order to save paper, as is often the case with those who are getting out catalogues.

SWEET & CLARK COMPANY, Marion, Ind.: Illustrated catalogue for 1891 of Hardware Specialties, comprising 40 pages of Curry Combs in 58 different styles, Mane and Tail Combs, combined Mane and Curry Combs, Horse and Curry Cards, the Sweet Boring Machine, Cooley Whip Racks, Garden Trowels, the Security Door Hasp and Fast Shackle Scandinavian Padlocks.

FOREST CITY BIT AND TOOL COMPANY, Rockford, Ill.: Wood Boring Tools, Machine Bits, End Boring Machine Bits Flat Cut; Hollow Chisel Bit with and without screw point, Screw Shank Bit, Counter

sink Bit, Counterbore Bit, Increase Twist Hub Bit, &c. Bits are made to order at special prices for special orders. Prices will be furnished upon receipt of samples or specifications. Some of the special styles of Bits enumerated above are made to order only.

THE WARNER MFG. COMPANY, Freeport, Ill: Circulars illustrating the Imperial Damper, the Imperial Poker, the U. S. Damper with cold handle and the Warner Parlor Door Hanger, all specialties manufactured by the company.

THE B. F. GOODRICH COMPANY, Akron Rubber Works, Akron, Ohio: Hose, Belting, Packing, Tubing, Sheet Rubber, Can Rings, Wringer Rolls, Gaskets, Molded Goods, Rubber Springs, Anti-Rattlers, Rubber Bags, Sheave Fillings, &c.; Bands and India Rubber Druggists' Sundries. Attention is directed to their facilities for making specialties in rubber. Estimates are given on receipt of specifications or model.

THE CLEVELAND HARDWARE COMPANY, Cleveland, Ohio: Rolled Carriage Specialties. Particular attention is directed to their Wrought Steps, which are made in various styles and shapes. The Steps are wrought iron, made from rolled blanks. The manufacturers claim that they are much superior to malleable iron Steps and are equal to drop-forged Steps in every respect, while the prices at which they are sold are much lower than drop-forged Steps are offered for.

VARIETY IRON WORKS, ALFRED C. REX & CO., Frankford, Philadelphia, Pa., and 106 Chambers street, New York: Toy and Hardware Specialties, Novelties, Ice and Roller Skates. Their catalogue of June 1, 1891, shows Toy Registering and Savings Banks in a large variety, Toy Scales, Toy Sad Irons, Skates, Lemon Squeezers, Hatchet, Axes, &c.

THE HEIKES HAND PROTECTOR COMPANY, Dayton, Ohio: Heikes' Hand Protector. This is a small half-roll of the finest spring steel, shaped by machinery so that it fits snugly on the gun at the point where the hand graps the barrel. It covers the under side of the barrel only, about 6 inches, sufficient to give the hand a good, firm grip. It is covered with a fine grade of leather, and, it is stated, is a non-conductor of heat or cold. The object of the Protector is to protect the hand from grasping heated or very cold barrels. It is claimed that the risk from a mangled hand, from a bursting gun barrel at this point, is thus reduced to an insurance against such an accident.

THE VANDERGRIFT MFG COMPANY, Jamestown, N. Y.: New Improved Western Washer, Improved Pan-American Washer, Self-Weighing Shot Case and American Hand-Seed Planters. A cut is given showing the Western Washer crated for shipping, with the panel containing the castings inside the machine. Attention is called to the fact that the crating is not nailed to the body of the machine.

Selling to Consumers.

AN ENTERPRISING Hardware merchant of Maryland, who has an extensive acquaintance with the trade in other States, thus refers to the mischief which is done by some jobbers and manufacturers who sell to contractors, builders and other consumers, thus taking away the retailers' legitimate business:

My real estate interests call me to different States in the Union, as I have property in Pennsylvania, Maryland, Virginia, West Virginia, Florida and Texas; also, I will add, business interests in Iowa and Indiana, making a total of eight different States. In addition to this, I have Hardware acquaintances and relatives in the Hardware business scattered broadcast. I cite these facts to confirm in your mind my position to find out the feeling of the Hardware trade. The trouble of which I desire to speak is simply this: There are a class of unscrupulous jobbers who seek the trade of mechanics, contractors of high and low degree, even to the extent of a trifling order, and all consumers of Hardware, spreading information and prices that frightfully antagonize the town Hardware stores, causing them unceasing annoyance and actual loss. This trade is sought through the medium of the mails (by issuing appeals in circular price-lists) and through traveling men, some of whom even possess the gall to visit the Hardware stores in quest of orders on the heels of their persistent visits to the back and muddy street shops, planing mills, lumber yards, mills, &c., &c., sowing seeds of discontent and breaking confidence with home dealers. They offer such prices that would not afford the country dealer a living profit, in view of freights, &c., &c. This makes the trouble all the greater. As this evil appears to be gaining ground, some remedy will, through self-defense, have to be resorted to to check it. The Hardware trade will be forced to turn down and ostracize such business houses, and organize a fraternity of interests to bring about this "consummation devoutly to be wished." The Hardware trade very naturally look to your paper as their champion in trouble.

It Is Reported—

That H. H. Haswell, dealer in Hardware, Harrison, Maine, is preparing to erect a new store, the present quarters being too small for the demands of his business.

That E. H. Steppee, Hardware, Rogers, Ohio, will probably erect a large new store.

That Noah Snider of West Alexandria, Ohio, has commenced the erection of a large Hardware building in Brookville, Ohio.

That the building and nearly the entire stock of D. M. Roy, dealer in Agricultural Implements, Muskegon, Mich., was recently destroyed by fire.

That Dennis Dean, dealer in Hardware, Superior, Wis., has disposed of his business to Wilber Robertson.

That Pipes & Brown, dealers in Hardware, Fulton, Ohio, have been dissolved. W. H. Brown will continue the business.

That the Waverly Mercantile Company have succeeded the firm of Hill & Smart, dealers in Hardware, Implements, &c., and Dewey, White & Co., general merchandise, Waverly, Kan. The capital stock of the new company is $40,000 In addition to Hardware and Implements they will carry a general line of goods.

That the partnership under the firm name of Pitkin & Merrick, Bolton Landing, N. Y., has been dissolved. Thurman J. Merrick and Seymour Merrick will continue the business under the firm name of Merrick Bros.

That Phelps Bros. will open a Hardware store in the Gordon Block, Barre, Vt.

That Taylor & Flack, Hardware dealers, East Orange, N. J., will do business with a capital stock of $50,000.

That Miller Bros., Alliance, Ohio, have opened a new hardware store in that city.

That G. E. Adams has purchased the interest of J. Q. Adams in the Hardware business of Adams Bros., Edinburgh, N. D.

That the Drake Hardware Company, Redlands, Cal., have recently enlarged their store building to accommodate their increasing business.

That Nebo Hardware Company, Nebo, Ill., have been incorporated to do a general Hardware business. The capital stock is $10,000 and the incorporators are H. E. Smith, R. E. Smith and S. H. Smith.

That W. H. Nattrus, dealer in Hardware, Aurelia, Iowa, has sold out his business to a new firm under the style of Nattrus & Brisch. The new firm has purchased the Hardware stock of C. S. Phelps of Aurelia and will combine both stocks.

That Baker & Foster, Beverly, Mass., who started in business only a few months ago, have met with such flattering success that they have found it necessary to take larger and more central quarters, where they propose to keep a full stock of everything in the Hardware line.

That Leonard & Normandy have succeeded to the business of Wm. Ball, dealer in Hardware, Duluth, Minn.

That the Hardware store of Nicholas E. Alton, Lorain, Ohio, was broken into on the 1st inst. and $250 worth of Hardware stolen.

That Momsen & Thorne, Hardware, Implements, &c., El Paso, Texas, were slightly damaged by a recent fire.

That Allen & Davis, Hardware, Hearne, Texas, were burned out recently. Loss, $15,000.

That C. W. Whittman, Hardware, Joplin, Mo., has sold out to W. B. Halyard.

That A. M. Morrison, dealer in Hardware, Mapleton, Iowa, has sold out to Carhart Brothers.

That Hunnicut & Bellingrath, dealers in Hardware and House-Furnishing Goods, Atlanta, Ga, have been succeeded by a chartered organization to be known as the Hunnicut & Bellingrath Company. This business change involves nothing beyond an exchange of name and the enlargement of business opportunities. The capital stock of the new company is fixed at $100,000, but a clause in their charter permits them to extend it to $250,000. The following are the officers elected to conduct the company's future business affairs: President, C. W. Hunnicut; mechanical manager, A. Bellingrath; secretary and treasurer, L. L. Hunnicut, and manager of sales, J. E. Hunnicut.

Business Rules.

SOME TIME AGO we published the substance of a manual containing suggestions and instructions for employees which was used by the Roberts Hardware Company, Denver, Col. Since then the company have revised and modified their manual, embodying in it the results of further experience. It is printed in the form of a neat and convenient pamphlet. The matter to which it relates is of very general interest to Hardwaremen, and the subject is receiving increased attention, as in concerns large and small the importance of good business methods and store discipline and system is more generally recognized. We are confident that the contents of the Roberts Hardware Company's pamphlet will be perused with much interest by many of our readers and be found suggestive to any who are preparing for their own use a such compendium of business regulations and maxims. We reproduce it entire:

RULES AND INSTRUCTIONS

OF THE

ROBERTS HARDWARE COMPANY.

RULE 1. Keep your eyes on the front door. Customers should be waited on promptly and pleasantly.

2. Wait on children as politely as you do on grown people. They are our *future* customers.

3. Salesmen, when disengaged, will take position near the front door, instead of the back. Customers do not come in at the rear.

4. Don't stand outside the front door when at leisure. It is an excellent notice to competitors and customers that trade is dull.

5. Salesmen are paid for waiting on customers, and are not expected to turn them over to the boys, or new men who are learning the business, while they busy themselves arranging or putting away goods.

6. Don't take a customer away from another salesman until he is through with him.

7. Don't turn a customer over to another clerk, if possible to avoid it, except for the dinner hour.

8. *Go for business* in every direction; in the store or out of it; wherever you see a chance to make a sale, work for it with all your might. RUSTLE!

9. Salesmen will sell at marked prices. Do not go to office for a *cut* price. It always makes trouble.

10. At retail the dozen price is to be allowed only when the customer takes a half dozen of each kind, or more. Less than half dozen, in all cases, to be at price for each.

11. Sorting up a line of goods allowed to make the quantity, the highest dozen price of the lot to be charged, when a half dozen or more are bought.

12. Clerks of other dealers are to be charged regular retail prices. If the houses they work for buy the goods for them it is a different matter.

13. Don't send a customer up stairs or down by himself.

14. Salesmen will avoid the responsibility of trusting customers whose credit is unknown to them by referring all such cases to the manager. Extending credit without authority makes the salesmen responsible for the amount.

15. In opening a new account get the business and post-office address of the customer correctly.

16. Never show a price-list to a customer; it confuses him, and he thinks he is paying more than he should when he sees the three columns of prices.

17. Salesmen are expected to sell the goods we have, not the goods we have not.

18. Salesmen are responsible for their mistakes and any expense attending their correction.

19. Always charge goods first in the day books. Make out the bill from the charge *in* the book. Make this an *invariable* rule.

20. If you have a charge to make, enter it *before* waiting on another customer; your memory is apt to be defective, and the sale forgotten before it is entered.

21. All cash bills over $5 enter in your sales book.

22. Make your charges accurate in detail or description by number, size, &c. By so doing it facilitates correction in case of dispute with the customer.

23. *Close* your entry books after making entry. Valuable information may be stolen by competitors.

24. Clerks receiving change from the desk will count the same and see if correct before handing it to the customer. Always hand the cash mem. with the money to the cashier.

25. If you know of an improvement of any kind, suggest it at once to the manager; it will be impartially considered.

26. Keep retail stock full and complete on the shelves, so as to avoid detaining customer. Notify each man in charge of a division, when you find anything short in it.

27. Always put the stock in order when through waiting on customers.

28. Always wipe off cutlery with chamois before putting away.

29. Each clerk is expected to see that his department is kept clean and in perfect order.

30. In arranging goods, put the smallest to the front; when the same size, cheapest to the front.

31. Use the early part of the day and the last hour before closing, in sorting and straightening up.

32. Prices are *not* to be cut. Report *every* cut price by other firms to the manager *after* the customer is gone, unless he is a well known and regular customer, in which case report at once.

33. *Do not smoke during business hours, in or about the store.*

34. Employees are requested to wear their coats in the store. It is not pleasant for a lady to have a gentleman waiting on her in his shirt sleeves, *or with his hat on.*

35. Employees are expected to be on hand promptly at the hour of opening.

36. Do not leave the store by the rear door.

37. Employees will remain until the hour of closing, unless excused by the manager.

38. The company will ask of you as little work after regular hours as possible. When demanded by the necessities of business, a willing and hearty response will be appreciated.

39. If an employee desires to buy anything from stock, he must buy it of the manager; in no case to take anything without doing so.

40. In purchasing for individual use around town, under no circumstances to use the name of the company as a means to buy cheaper.

41. Employees pay for whatever they damage; they are placed on their HONOR to report and pay for it.

42. Goods and tools (new or old) must not be lent; it kills the sale for them. Refer all borrowers to the manager. Who goes into a clothing store to borrow a shirt, or to a grocer to borrow sugar?

43. *Never use new tools.*

44. When through using the store tools, put them back in the place they belong.

45. Employees using bicycles will keep them in the cellar or in the back yard; they must not be left where they will cause inconvenience.

46. Conversation with the bookkeeper, or the cashier, except on business, interferes materially with the work. Do not forget this.

47. Clerks, when on jury duty, have the privilege of turning in their fees, or having the time absent deducted from their wages. Drawing a salary for their services, the company is entitled to their time, or its equivalent.

48. Any goods sent out to be repaired must be entered in the book kept for that purpose, and when returned reported at the desk and the charge canceled.

49. Watch the ends of stock, make as few as possible, and always work them off first, to keep the stock clean.

50. Keep *mum* about our business. *Always* have a good word to say for it, and never say it is dull. Keep your eyes and ears open about your competitors.

51. One hour is allowed employees for meals.

IT WILL PAY YOU

TO LEARN THE FOLLOWING BY HEART.

Towards customers be more than reasonably obliging; be invariably polite and attentive, whether they be courteous or exacting, without any regard to their looks or condition; unless, indeed, you be more obliging and serviceable to the humble and ignorant.

The more self-forgetting you are, and the more acceptable you are to whomsoever your customer may be, the better you are as a salesman. It is your highest duty to be acceptable to all.

Cultivate the habit of doing everything *rapidly;* do *thoroughly* what you undertake, and do not undertake more than you can do well.

Serve buyers in their turn. If you can serve two at once very well, but do not let the first one wait for the second.

In your first minute with a customer you give him an impression, not of yourself, but of the house, which is likely to determine, not whether he buys of *you*, but whether he becomes a buyer of the house or a talker against.

If you are indifferent, he will detect it before you sell him, and his impression is made before you have uttered a word. At the outset you have to guess what grade of goods he wants, high priced or low priced. If you do not guess correctly, be quick to discover your error, and right

yourself instantly; it is impertinent to insist upon showing goods not wanted. It is delicately polite to get what is wanted adroitly on the slightest hint.

Do not try to change a buyer's choice, except to this extent: Always use your knowledge of goods to his advantage, if he wavers or indicates a desire for your advice. The worst blunder that you can make is to indicate in a supercilious manner that we keep better goods than he asks for.

Show goods freely to all customers; be as serviceable as you can to all, whether buyers or not.

Sell nothing on an understanding; make no promises that you have any doubt as to the fulfillment of, and, having made a promise, do more than your share toward its fulfillment, and see that the next after you does his share, if you can.

Never run down your competitors to customers. By so doing you advertise them. It won't pay you to get trade in that way. Competitors can talk back.

To sum up and put this whole matter in a few words: Attend strictly to business when on duty; be *invariably* polite and obliging to *every one*, not only for the benefit of the company, but for *your own* good. Remember that civility, while it may be one of the scarcest articles in the market, is also one of the cheapest, and the net profit on it *to you*, in the end, will be greater—not only from a social and moral point of view, but in *dollars and cents*—than on anything else you may have to offer a customer.

Remittance Blanks.

THE PUBLICATION of forms for remittance blanks in recent issues has called forth from the trade an interesting budget illustrating different forms of such blanks which are used by our correspondents. We shall take pleasure in reproducing some of the most interesting and meritorious as the pressure on our space will permit. In the meantime we shall be glad to hear from others in the trade who have remittance blanks embodying special features, as this is a matter in which the trade are evidently interested. The above blank is that used by Fruit, Ohl & Co., Sharon, Pa., and is referred to by them as an exceedingly convenient and serviceable form.

MEMORANDUM.

FRUIT, OHL & Co.,

WHOLESALE HARDWARE.

Sharon, Pa., 1891

To

Enclosed find ____ *in payment of the following invoice.*

Date of Invoice.	Gross Amount.	Deductions.	Net Amount.	Total Net.

Please acknowledge receipt and oblige,

Yours truly,

FRUIT, OHL & CO.

Per

Exports.

PER BARK NEPTUNE, MAY 26, 1891, FOR PORT NATAL, SOUTH AFRICA.

By W. H. Crossman & Bro.—45 cases Agricultural Implements, 3 Ladders, 60 cases Carpenters' Hardware, 6000 pounds Nails, 800 feet Rubber Hose, 3 dozen Bird Cages, 1 bundle and 6 Ladders, 2 dozen Pumps, 1 dozen Washing Machines, 10 dozen Hoes, 6 Forges, 6 cases Hardware, 28 Stoves, 2 cases Agricultural Implements, 26 Builders' Hardware, 36 cases Agricultural Implements, 2500 pounds Nails, 5 dozen Builders' Hardware.

By H. W. Peabody & Co.—600 pounds of Nails, 3 packages Hardware, 35 packages Farming Implements, 1 case Edge Tools, 3 dozen Rakes.

By W. H. Crossman & Bro.—12 cases Agricultural Implements, 362 pounds Rubber Packing, 86 dozen Carpenters' Hardware.

PER BARK HOMET, MAY 26, 1891, FOR PORT ELIZABETH, SOUTH AFRICA.

By W. H. Crossman & Co.—18 dozen Hoes, 17 cases Hardware, 7 gross Fruit Jars, 11 cases Agricultural Implements, 8 dozen Rat Traps, 3 dozen Bench Screws, 24 Scales, 6 Washing Machines, 18 cases Agricultural Implements, 3 dozen Ladders, 6 Scales, 1 dozen Hardware, 18 Churns, 11 dozen Hardware, 78 cases Agricultural Implements, 400 Reels Barb Wire, 1 case Washing Machines, 21 packages Agricultural Implements, 2½ dozen Hardware, 60 dozen Hardware, 1 case Bird Cages, 4 cases Hardware 3 dozen Shellers, 41 dozen Hardware.

By H. W. Peabody & Co.—15 packages Stoves.

By Corner Bros. & Co.—69 dozen Tools, 6 Grindstones.

By John Norton & Son.—13,000 Cartridges, 85 kegs Nails, 40 Scales, 46 packages Agricultural Implements, 11 packages Agricultural Implements.

By the Goulds Mfg. Company.—1 case Pumps.

By Eureka Fire Hose Company.—750 feet Garden Hose.

By John Norton & Son.—24 dozen Hardware, 10,000 Cartridges.

PER BARK MARY E. RUSSELL, MAY 27, 1891 FOR PORT NATAL, SOUTH AFRICA.

By Arkell & Douglas.—500 reels Wire, 10½ dozen Lampware, 9000 pounds Nails, 100 pounds Staples, 4 cases Washing Machines, 1000 feet Hose, 1 gross Beaters, 27 dozen Wrenches, 2 dozen sets Sad Irons, 66 Choppers, 6 Mangles, 18 Pumps, 2 dozen Bits, 31 dozen Saws, 3 dozen Bench Screws, 20 dozen Shears, 6 Refrigerators, 500 pounds Nails, 24 Ladders, 137 pounds Stone, 16 dozen Axes and Hatchets, 12 Store Trucks, &c., 7 packages Cultivators, 15 Mowers, 7 cases Traps, 135 cases Agricultural Implements, 215 dozen Axes and Hatchets, 4 cases Meat Cutters, 8 dozen Lamps, 16 cases Hardware.

By Coombs, Crosby & Eddy.—828 Plows, 56 Cultivators, 17 Scales, 16 Corn Shellers, 66 cases Plow Parts, 12 cases Sash Weights and Cords, 1 gross Polish, 2 Fly Fans, 9 dozen Hardware, 46 dozen Edge Tools, 33 dozen

Tools, 8 dozen Forks, 4½ dozen Snaths, 6 dozen Traps, 3 dozen Churns, 6 dozen Hoes, 13 Churns, 6 Ranges, 2 Lawn Mowers, 630 pounds Brads, 7 Churns, 16 dozen Tools, 6 Lamps, 6 Horse Hoes, 2 Drills, 100 feet Hose, 1 Refrigerator, 60 dozen Plated Ware, 680 pounds Bird Cages, 2 dozen Wheelbarrows, 56 Plows, 6 Road Scrapers, 1 Corn Sheller, 9 Saws, 3 Churns, 1 dozen Lamps.

PER BARK LIZZIE CURRY, MAY 27, 1891, FOR LAUNCESTON, TASMANIA.

By W. A. Wood.—152 packages Agricultural Implements.

By R. W. Forbes & Son.—20 dozen Hay Forks, 19 dozen Axes and Hatchets, 15 Churns, 1¼ dozen Meat Choppers, 56 pounds Oil Stone, 1 box Carriage Hardware.

By Strong & Trowbridge.—4 dozen Door Springs, 22 Pumps, 5000 Cartridges, 50 dozen Buckets, 50 dozen Bush Hooks, 30 kegs and 8 cases Nails, 6 dozen Wrenches, 8½ dozen Lampware, 20 kegs Nails, 136 dozen Axes, 34 dozen Hatchets, 29½ dozen Hardware, 6000 Bolts, 184 pounds Plated Ware, 33 dozen Hoes, 2 cases Miter Boxes, 10 dozen Axes, 30 dozen Lampware, 23 gross Fruit Jars, 57 dozen Saws, 15 dozen Hog Rings and Ringers, 3 cases Plow Parts, 32 dozen Picks, 40 dozen Hardware, 3 dozen Hay Knives, 10 dozen Axes, 81 dozen Forks, 7 cases Hardware, 15 dozen Scythes, 15½ dozen Hammers, 30 Churns, 13 dozen Bush Hooks, 18,019 pounds Barb Wire, 6 sets Bits, 1 Boring Machine, 24 Door Springs, 9 Drills, 4 dozen Locks, 40 dozen Snaths, 1 1-6 dozen Boring Machines, 1 dozen Tills, 39 dozen Strainers, 6 dozen Wrenches, 18 Stoves, 128 dozen Shovels and Scoops.

PER BRIG REGUBUEN, MAY 28, 1891, FOR EAST LONDON, SOUTH AFRICA.

By W. H. Crossman & Bro.—10 cases Sash Weights, 1 bale Sash Cord, 178 cases, 13 crates and 20 packages Agricultural Implements and parts, 18 cases Agricultural Implements, 1 dozen Hardware, 144 cases Agricultural Implements and Parts, 5 packages Stove Parts, 144 cases Agricultural Implements and Parts, 1 case Hardware, 2 cases Store Trucks, 20 crates Stoves and Parts.

By Coombs, Crosby & Eddy.—122 kegs Nails, 5 kegs Wire Nails, 2 cases Plated Ware, 11 cases Hardware, 41 dozen Edge Tools, 33 dozen Carpenters' Tools, 600 feet Rubber Hose, 6 reams Sandpaper, 3¾ gross Fruit Jars, 1 dozen Scythes, 24 Churns, 5 Scales, 12 Shellers, 9 Store Trucks, 15 Ladders, 6 kegs Brads, 16 Plows, 5 dozen Plow Parts.

PER BARK STAR OF THE EAST, JUNE 2, 1891, FOR DUNEDIN, NEW ZEALAND.

By W. A. Wood.—120 packages Harvesters and Binders, 4 boxes Extra Parts Mowers, &c., 60 packages Harvesters and Binders, 60 packages Harvesters and Binder.

By J. G. Kollins & Co.—13 dozen Clothes Wringers.

By W. K. Freeman.—21 cases Horse Nails, 26 Lawn Mowers, 2090 pounds Axles.

By A. S. Lascelles & Co.—1 gross Razor Strops.

By R. W. Forbes & Son.—1 Mower, 1 Air Gun, 10 dozen Axe Handles, 300 gross Crayons, 4 cases Plated Ware.

By Strong & Trowbridge.—½ dozen Meat Choppers, 10 dozen Axes, 1 box Stamped Ware, ½ dozen Sowers, 1 box Nails, 12 pound Hardware, 10 Stoves, 1 dozen Axes, 3 dozen Hardware, 5 Stoves, 15 dozen Hammers, 27 gross Lampware, 1 dozen Wringers, 225 pounds Hardware, 397 pounds Nails, 6 dozen Rakes, 24 Meat Choppers, 12 Lawn Mowers, 1 case Wringers, 47 pounds Hardware, 3 dozen Blocks, 2 dozen Hoes.

FOR LYTTLETON.

By W. A. Wood.—10 Mowers, 5 Reapers, 60 packages Mowers, 5 Reapers, 20 packages Mowers.

By W. H. Crossman & Bro.—1 hogshead Pump parts, 389 pounds Iron Fittings.

By Meriden Britannia Company.—2 packages and 2 boxes Plated Ware.

By Coombs, Crosby & Eddy.—24 pounds Twine, 23 dozen Tackle Blocks.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

The past week has been an uneventful one in the Paint and allied trades. As far as the leading pigments are concerned, there is not the slightest change to record, and the movement in other lines has been unimportant. Philadelphia manufacturers still figure as a more or less disturbing element in Whiting and Putty by selling their product in this city and immediate vicinity at a round concession on local manufacturers' prices, but the doings in these lines contrast in no remarkable degree with what has been going on for several weeks. The movement of Leads, Zincs and house painters' Colors has continued rather slow by the delays in local building operations, but out of town orders come along in about the usual way, and now that there are signs of the building trades difficulties being out of the way ere long a better general distribution is calculated upon. In the absence of any further change in the Linseed Oil market manufacturers of Oil Colors and Mixed Paints adhere to old list prices, but make some little concession in the shape of a special discount when attractive orders are under consideration

White Lead.—The distribution of both pure pigment and mixed Leads has been on a somewhat more liberal scale, but the movement seems still to fall short of what has been calculated upon and the market presents a tame appearance. Nothing new transpires as regards competition between corroders' product and other varieties and the condition of the market for crude materials would operate to steady prices rather than encourage expectations of a lower level of values. The fall in Linseed Oil prices has thus far had little or no influence upon Lead in Oil, being neutralized in a measure by the enhanced cost of Pig Lead, and present indications are that more forcible conditions are necessary to cause corroders to reduce their quotations. The official list is disregarded by jobbers, but the liberties taken are no more than have been of common occurrence heretofore.

Zincs.—Manufacturers are securing quite as many orders as they usually do for American Oxide at this season of the year, and the deliveries making keep surplus stocks within very narrow bounds. For that matter some manufacturers find it difficult to make entirely satisfactory deliveries. The movement of foreign brands is on a liberal scale. Prices stand as before, with a firm undertone to the market for both domestic and imported varieties.

Colors.—Operations in Quicksilver Vermilion have been on a rather larger scale, and the market is very firm, with indications that prices will be advanced in the event of a further rise in cost of Quicksilver. Lead Vermilion is selling to a moderate extent only, and the same may be said of other dry Colors adapted to house-painters' use. Grinders' Colors meet with fair sale at generally steady prices.

Miscellaneous.—Block Chalk has been sold at $2.50 ex-vessel, and future shipments are offered at a lower price without important results in the way of business. Philadelphia and Western manufacturers are still offering Whiting at irregular prices that keep values unsettled here, and there is still considerable outside competition in Putty at prices below those quoted by local manufacturers.

Oils and Turpentine.

Changes in this line have been few and unimportant during the past week, and the surroundings are free from circumstances pointing to any radical movement in the immediate future. With no particular incentive to liberal buying, the home-trade movement has been of strictly routine character. Exporters have manifested comparatively little interest, and their inquiries have been such as would indicate that the foreign markets are in no urgent need of supplies. The few changes in prices that have taken place show slight gains to the advantage of buyers, the result chiefly of lower figures for Lard and slow general movement.

Linseed Oil.—No further change in prices has been made by local crushers, and the offering of out of town brands, while at somewhat irregular prices, is no more urgent at the present time than it was a week ago. In short, the market has been fairly steady, with the volume of business fully up to the average for the season, and any movement in values seems now to be dependent in a great measure upon the action of Western manufacturers.

Cotton-Seed Oil.—The dealings in refined product have been on a somewhat larger scale. One block of 1100 barrels of so-called good "off" grade refined was sold at 36¢, 100 barrels poorer quality went at 33¢ and about 800 barrels better grade were disposed of at 42¢. These prices are practically the same as those that ruled a week ago, and, while opinions are somewhat variable as to the undertone of the market, it requires very nice discrimination to point out any change for the past week.

Lard Oil.—Local pressers have knocked off another 1¢ per gallon from their price of prime Oil. Sellers of Western brands have done likewise. This brings the market value down to 52¢ and 51¢, respectively. The reduction is due to a further fall in the Lard market, under which the cost of production is lessened. Immediately after the decline a very fair business was consummated, but the market has since relapsed into a condition of dullness and is very quiet at the present time.

Menhaden Oil.—The report has circulation that manufacturers of crude Oil have formed a strong combination, but, pending results of the fishing nothing tangible as to the strength of the combination can be learned. Business is at a pause for the time being and market value is uncertain. Pressers are naming former prices for Pressed and Bleached product.

Sperm and Whale Oils.—Crude product is wholly unchanged. There is little demand at present and the offering is moderate. The manufactured products are selling fairly in a jobbing way at old prices.

Miscellaneous.—Olive Oil, in barrels, is still unsettled, with 68¢ now a full outside rate and business reported at 65¢. Tallow Oil has dropped to 42¢ and is slow. Cocoanut Oils quiet at former prices.

Spirits Turpentine.—Supplies have increased considerably at Southern centers and prices have weakened there somewhat in consequence. The receipts at this point have been well absorbed, however, and local prices have undergone very little change.

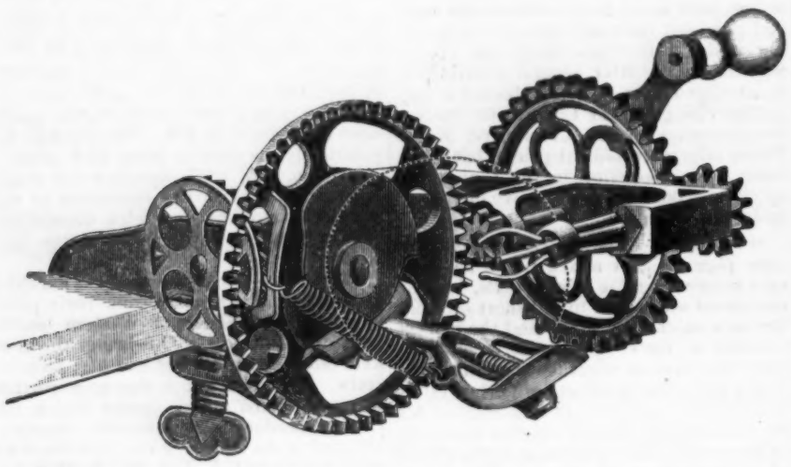
Col. A. L. Conger, of Akron, was in Cleveland on Saturday last on his way to Chicago. He says the manufacture of tin plate in this country is as yet only in an experimental state, but that the outlook is very encouraging. He is interested in the large tin-plate mill to be built at Elwood, Ind.

Furnace E of Carnegie Bros. & Co., Limited, at Braddock, Pa., which has been idle for some time undergoing repairs, was put in blast on the morning of the 7th inst. The entire plant of this firm at the above place, consisting of nine furnaces, is now in successful operation. Eight of the stacks are running on Bessemer iron and one on spiegel. The total product for the nine stacks will average 15,000 tons per week. The two Lucy Furnaces of this firm at Pittsburgh are also in operation, producing 3500 tons per week, the two plants giving the firm a total production of 18,500 tons per week.

Samuel D. Mills, formerly with the Martel Furnace Company, St. Ignace, Mich., has accepted the position of general superintendent of the Tassie Belle Furnace, at New Birmingham, Texas.

Monarch Peach and Apple Parer, Improved.

L. A. Sayre, Newark, N. J., is offering the trade the Monarch Peach and Apple Parer in an improved form, as illustrated herewith. The improvement consists in the form of the knife, which is a flat circular blade, like a washer, fastened to a thimble-shaped head, set at an angle of about 25° to the fruit, and operated by universal or knuckle joint. In the improved form the knife is referred to as different from any other, and as being at the same time an exceptionally good and desirable form. In other respects the parer is unchanged.



Monarch Peach and Apple Parer, Improved.

Thresher Double-Acting Suction and Force Pumps.

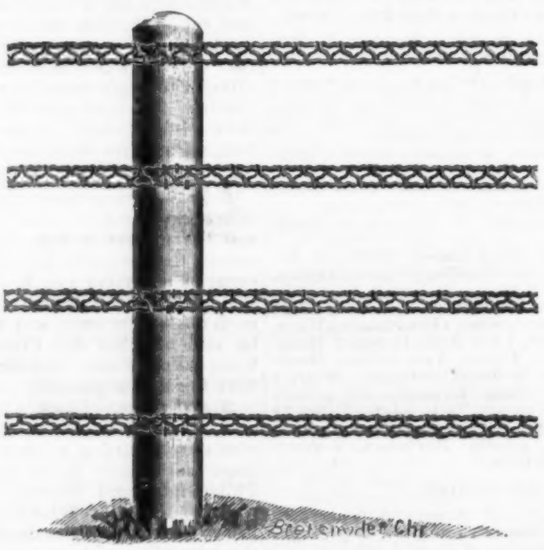
The Goulds Mfg. Company, Seneca Falls, N. Y., and 16 Murray street, New York, are introducing a thresher tank pump, as illustrated herewith, which is the result of their study to produce a cheap, yet serviceable, tank pump. It is described as follows:

Its compact form is contributed in part by design and construction of the horizontal double-acting cylinder, which has a capacity of two single-acting cylinders of same diameter and stroke, or about one and a half to two barrels per minute. In this cylinder are grouped the metal valves resting on brass valve seats, thus obviating a common fault in leather valves, which often grow stiff and useless from disuse, and iron valves, which will rust fast to iron valve seats. The discharge valves above are readily accessible through ports or hand holes closed with neat plugs, while the suction valves below may be exposed by removing their cylinder head, as can easily be done. The solid piston is double-crimped packed, and the piston rod, of polished steel, works through a brass stuffing box. The waterways are large and direct, insuring an easy working and efficient pump. It occupies a space 9 x 20 inches, and has a detachable wood lever, permitting safe removal in transit or storing. The manufacturers claim that it has one working cylinder, plunger and rod, yet it takes water at each end of the stroke, resulting in no lost motion or labor in recovery; that the metal valves and valve seats insure freedom from trouble with stiff, useless leathers, and that the removable plugs covering the valves allow the easy examination of the working parts. It is stated that the pump is applicable for filling thresher wagon tanks for boiler supply, household uses, watering stock, &c.; for cleaning out boilers, draining cellars, barnyards, &c.; irrigating land from ditches or shallow wells; also for washing wagons, windows, &c.; spraying fruit trees, shrubs and bushes, and for protection against fire.

Thresher Double-Acting Suction and Force Pump.

The New Aurora Wire Fencing.

The accompanying illustration represents a new style of wire fencing which has just been put on the market by the Chicago Wire Goods Company, 23 Lake street, Chicago, whose factory is at Aurora, Ill. The fence consists of two slightly corrugated parallel wires of No. 12 gauge, running 1 inch apart, joined and supported by interlaced filling wire of No. 15 gauge, alternating in the corrugations of the parallel wires. The fencing weighs 20 ounces to the rod. It is manufactured by a special machine, and its construction is such that the wire is not weakened in the process of making it, while it will not sag or stretch. It is not only strong, but is distinctly visible by stock. There are no points to tear even the finest of fabrics, so that it is not only adapted to inclosing fields, but is also sufficiently ornamental for use in fencing lawns and gardens. It is galvanized to protect it from rust. The corrugations are a safeguard against breakage from contraction in cold weather. The company also manufacture a clutch to grasp both parallel wires, which can be used with any ordinary stretcher. The fencing is put up in spools of convenient dimensions, of about 65 pounds each.

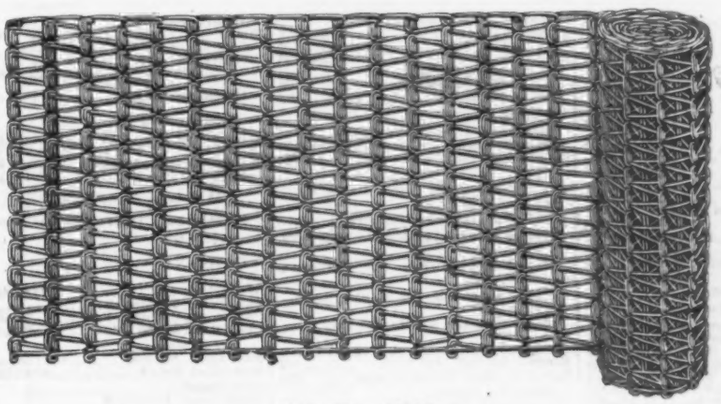


New Aurora Wire Fencing.

F. E. Myers & Bro.

The *Farm Implement News* has an interesting account of the beginning and growth of the firm of F. E. Myers & Bro., with excellent pictures of F. E. and P. A. Myers, who compose the firm. F. E. Myers began the sale of agricultural implements in 1875, at Ashland, Ohio, which is the present location of the Ashland Pump and Hay Tool Works. Soon after 1875 F. E. Myers associated with him as partner his brother, P. A. Myers, who had been in his employ, and the firm then assumed their present name. About the year 1880 they began the manufacture of pumps, which department has been vigorously pushed ever since. The firm own valuable patents on double-acting force pumps; also on their glass valve seat, submerged cylinder drill well and hydraulic windmill regulators. In 1884 patents were granted to P. A. Myers for a cable or iron track hay carrier and for a wood or steel

track carrier that is reversible; in 1886, a patent on a steel track or way for hay carriers and a sling attachment, and a patent for a shir sling attachment in 1887. Among their most important hay-tool patents may be named the Double Lock Reversible Myers Carriers, the Double Metal Rail Steel Track and New Departure Sling patents. New inventions are being continually brought out by the firm in connection with their hay tools and pumps. At the present time they employ 160 men in the different departments of their works, with ten men constantly on the road. Their works have never been shut down two weeks since they first began manufacturing.



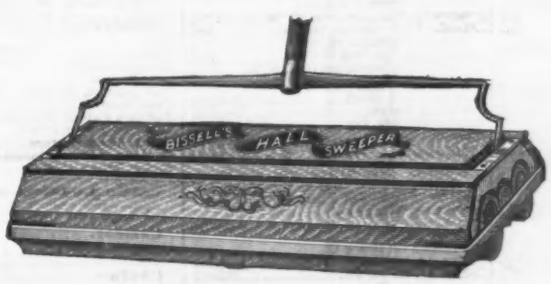
U. S. Wire Matting.

Bissell's New Hall Sweeper.

Bissell Carpet Sweeper Company, Grand Rapids, Mich., are introducing the new hall sweeper, as illustrated herewith. The manufacturers refer to it in the following terms:

It is not only a large sweeper for large surfaces, but it is delicately adjusted, substantial and an unusually effective sweeper for almost any use. It is just what a sweeper should be that is intended to be used to any considerable extent, and is the result of nearly five years of expensive experimenting and study on our part.

We are advised that though the sweeper was not originally intended for use on bare floors, it is proving eminently satisfactory for that purpose: and that the ease with which it can be handled, and its unusual effectiveness, which, it is stated, comes from its size and weight, lead the manufacturers to believe that it will be preferred by a great many people for even the ordinary house uses.



Bissell's New Hall Sweeper.

U. S. Wire Matting.

United States Wire Mat Company, Decatur, Ill., are introducing wire matting, as illustrated herewith. The matting is made of Nos. 12 and 14 galvanized steel wire, also of brass wire. The matting both rolls and folds, and is referred to as being as pleasing to the eye as Brussels carpet. The manufacturers claim that these goods meet every demand for which a mat can be used; that they are elastic, flexible and cleanly; that they are so woven that they form a good scraping surface in any position; that the mat is made any length desired and almost any width, and that they are warranted not to turn up at the corners. The matting is regularly put up in rolls containing 50 or 100 lineal feet, which is an advantage to dealers having long mat trade, as any length of mat can be supplied by simply cutting two wires, and thus avoid the usual delay in having mats made to the size required. These goods are recommended for the hardware and house furnishing trade, as adapted for use in private and public buildings, billiard rooms, bar rooms, offices, street cars, &c.,

A press telegram from Moline, Ill., dated June 5, states that representatives of the Eastern syndicate which had almost completed negotiations for the purchase of the plow factories of Deere & Co. and the Moline Plow Company, and the corn planter works of the Deere & Mansur Company, have left the city after having been refused an extension of the option until fall. The Moline companies say that they did not deem it wise to place themselves in a position of being on the market indefinitely, but that is not improbable that the negotiations will be renewed in the fall.

Contracts were let by the World's Fair directors on the 4th inst. for the construction of the electricity building as follows: Carpentry and iron work, Arthur Johnson & Bro. of Omaha, $164,444; exterior covering, Park & Bates, Chicago, $85,600; painting and glazing, W. P. Nelson & Co., Chicago, $6522; lathing and plastering, John Griffiths, Chicago, $6000. Action on the contract for roofing was deferred until the Committee on Grounds and Buildings could look into the responsibility of the firm bidding and the sufficiency of the bond. This matter will be acted upon in a short time and work will be begun at once, as the contract calls for the completion of the building by February 15, 1892. There will be no delay in starting the work, and material will be put on the ground as soon as the Columbian Exposition Company afford facilities for unloading.

The Albany Construction Works, organized about a year since at Albany, N. Y., are now successful bidders for a large part of the iron work on the city's school buildings and new constructions of all kinds. The firm consists of Thomas J. Dowling, who was with Jas. McKinney & Sons' Architectural Iron Works for 11 years, and Harry E. Campbell, formerly connected with the same establishment. The plant is located at Nos. 403, 405 and 407 North Pearl street. The establishment was formerly used by G. Kemp as a machine and general jobbing shop. The concern takes up everything from the massive pillar and beam work to the artistic and fine designs in ornamental work.

The famous house of Russell & Co., probably the last of the old-time China trading firms, has failed.

CONTENTS.

CURRENT HARDWARE PRICES.

JUNE 10, 1891.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Adjusters, Blind.

Domestic.....₩ doz $3.00, 33⅓%
Excelsior.....₩ doz $10.00.....50&10&2%
Washburn's Self-Locking.....20@20&10%

Ammunition.—

Caps, Percussion, ₩ 1000—
Eicks & Goldmark's and Union Metallic Cartridge Co.
F. L. Waterproof, 1-10's.....34@35¢
E. B. Trimmed Edge, 1-10's.....46@48¢
E. B. Grnd. Edge, Cent. Fire, 1-10's.....45@47¢
Musket Waterproof, 1-10's.....56¢
G. D.....28¢
A. E. Genuine Imported.....45¢
Eley's E. B.....54¢ @ 57¢
Eley's D Waterproof, Central Fire...$1.00

Cartridges—
Rim Fire Cartridges.....50&5&2%
Rim Fire Military.....15&2%
Cent. Fire, Pistol and Rifle.....25&5&2%
Cent. Fire, Military and Sporting.....15&5&2%
Blank Cartridges, except 22 and 32 cal., additional 10% on above discounts.
Blank Cartridges, 22 cal., $1.75.....2%
Blank Cartridges, 32 cal., $3.50.....2%
Primed Shells and Bullets.....15&5&2%
B. B. Caps, Round Ball, $1.75.....2%
B. B. Caps, Con. Ball, Swgd., $2.00.....2%

Primers—
Berdan Primers, $1.00.....2%
B. L. Caps (for Sturtevant Shells) $1.00.....2%
All other Primers, $1.20.....2%

Shells—
First quality 4, 8, 10 and 12 gauge.....25&10&2%
First quality, 14, 16 and 20 gauge ($10 list).....30&10&2%
Prize.....40&2%
Star, Club, Rival and Climax brands.....33⅓&10&2%
Seibold's Comb. Shot Shells.....15&2%
Brass Shot Shells, 1st quality.....60&2%
Brass Shot Shells, Club, Rival, Climax.....65&2%

Shells Loaded—
Standard List, July 19, 1890....40&10%
Wads—Price per M.

U.M.C.&W. R. A.—B. E., 11 up...	68¢	Dis. 30&3
U.M.C.&W. R. A.—B. E., 9&10...	82¢	
U.M.C.&W. R. A.—B. E., 8.....	96¢	
U.M.C.& W.R. A.—B. E., 7.....	$1.10	
U.M.C.&W. R. A.—P. E., 11 up..	1.15	
U.M.C.&W. R. A.—P. E., 9&10..	1.50	
U.M.C.&W. R. A.—P. E., 8.....	1.70	
U.M.C.&W.R. A.—P. E., 7.....	1.80	

Eley's B. E., 11 up.....$1.75
Eley's P. E., 11@20.....2.80

Anvils.—

Eagle Anvils, ₩ ℔ 10¢.....15@15&5%
Peter Wright's.....11@11½¢
Armitage's Mouse Hole.....10½@11¢
Armitage's Mouse Hole, Extra...12@12½¢
Trenton.....10@10½¢
Wilkinson's.....10½@11¢
Moore & Barnes Mfg. Co.....33⅓%

Anvil Vise and Drill—
Millers Falls Co., $18.00.....20%
Cheney Anvil and Vise.....25%
Allen Anvil and Vise, $8.00.....40&10%
Star.....45&5%

Apple Parers—See Parers. Apple, &c.

Augers and Bits—

Douglass Mfg. Co.	70&10%
Wm. A. Ives & Co.	
Humphreysville Mfg. Co.	
French, Swift & Co. (F. H. Beecher, P. S. & W. Co.	
Rockford Bit Company	

Cook's, Douglass Mfg. Co.....55%
Cook's, N. H. Copper Co.50&10@50&10&5%
Ives' Circular Lip.....60%
Patent Solid Head.....30%
C. E. Jenning & Co., No. 10, extension lip.....40%
C. E. Jennings & Co., No. 30.....60%
C. E. Jennings & Co., Auger Bits, ₩ set, 32½ quarters, No. 5, $5; No. 30, $8.50.20%
Lewis' Patent Single Twist.....45%
Russell Jennings' Augers and Bits.25&10%
Imitation Jennings' Bits.....60@60&5%
Snell's Jennings Pattern.....60%
Pugh's Black.....20%
Rockford, Jenning's Pattern.....60%
Car Bits.....60@60&10%
Car Bits, P. S. & W. Co.....60&10%
Snell's Car Bits.....60%
L Hommodieu Car Bits.....15&10%
Forstner Pat. Auger Bits.....20%
Cincinnati Bell-Hangers' Bits.....30&10%

Bit Stock Drills—
Morse Twist Drills.....50&10&5%
Standard.....50&10&5%
Cleveland.....50&10&5%
Syracuse, for metal.....50&10%
Syracuse, for wood (wood list).30@30&5%
Williams' or Holt's, for metal.50&10&10%
Williams' or Holt's, for wood...40&10%
Cincinnati, for wood.....30&10%
Cincinnati, for metal.....45&10%

Expansive Bits—
Clarks' small, $18; large, $36 ₩ .35@35&5%
Ives' No. 4, ₩ doz $60.....40%
Swan's.....40%
Steer's, No. 1, $36; No. 2, $22.....35%
Stearns' No. 2, $48.....20%

Gimlet Bits—
Common.....₩ gross $2.75@$3.25
Diamond.....₩ doz $1.10.....25&10%
Bee.....25@25&5%
Double Cut, Shepardson's.....45@45&10%
Double Cut, Ct. Valley Mfg. Co...30&10%
Double Cut, Hartwell's, ₩ gro.....$5.25
Double Cut, Douglass'.....40&10%
Double Cut, Ives'.....60@60&10%

Hollow Augers—
Ives.....33⅓ @ 35⅓&10%
French, Swift & Co.
Douglass'
Bonney's Adjustable, ₩ doz $48.....40&10%
Stearns'.....20&10%
Ives' Expansive, each $4.50.....50&5%
Universal Expansive, each $4.50.....30%
Wood's.....25@25&10%
Cincinnati Adjustable.....25&10%
Cincinnati Standard.....25&10%

Ship Augers and Bits—
L'Hommedieu's.....15&10@15&10&5%
Watrous'.....15&10@15&10&10%
Snell's.....15&10@15&10&5%
Snell's Ship Auger Patt'n Car Bits, 15&10@15&10@5%

Awl Hafts—See Hafts, Awl.

Awls, Brad Sets, &c—

Awls, Sewing, Common ₩ gr $1.70, 35%
Awls, Should. Peg, ₩ gr $2.45, 40@40&10%
Awls, Pat. Peg...₩ gr 65¢.....40@40&10%
Awls, Shouldered Brad...2.70 ₩ gr.....35%
Awls, Handled Brad...$7.50 ₩ gr.....45%
Awls, Handled Scratch ₩ gr, $7.50.35&10%
Awls, Socket Scratch, ₩ doz, $1.50.25@30%

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

	Plain.	Beveled.
First quality, best brands	$7.00 @	$7.50
First qual., other brands	6.62½ @ 6.75	
Second quality	6.00	6.50

Axle Grease—See Grease, Axle.

Axles—

No. 1,4½@5¢, No. 2 5½@6¼¢ } 3% cash
Nos. 7 to 14.....55&5%
Nos. 15 to 18.....47½%
Nos. 19 to 22.....70%
Concord Axles, loose collar.....5½@6¢
Concord Axles, solid collar.....6½@7¢
National Tubular Self-Oiling.....33⅓%@33⅓&5%

Bag Holders.—See Holders, Bag.

Balances—

Spring Balances.....40%

No. 3000	20	30
Chatillon, ₩ doz...	$0.80	0.96	1.75 net

Chatillon Straight Balances.....40%
Chatillon Circular Balances.....50&10%

Bars.

Crow—
Cast Steel.....₩ ℔ 3½¢
Iron, Steel Points.....₩ ℔ 3¢

Basins, Wash—

Standard Fiberware, No. 1, 10½-inch, $2; 12-inch, $2.25; 13½-inch, $2.75; 15-inch, $3.25.

Beams, Scale—

Scale Beams, List Jan. 12, '82...50&10@50&10&5%
Chatillon's No. 1.....40%
Chatillon's No. 2.....50%
Custer's.....33⅓%

Beaters—

Egg—
Dover.....₩ doz $1.50
Duplex (Standard Co.).....₩ doz $1.25
Rival (Standard Co.).....₩ doz $1.00
Duplex Extra Heavy (Standard Co.)....₩ doz $3.50
Bryant's.....₩ gro $14.00
Double (H. & R. Mfg. Co.), ₩ gro. No. 0, $12.00; No. 1, $15.00; No. 2.....$36.00
Easy (H. & R. Mfg. Co.).....₩ gro $12.00
Triple (H. & R. Mfg. Co.).....₩ gro $16.50
Spiral.....₩ gro $4.25 @ 4.50
Improved Acme (H. & R. Mfg. Co.).....₩ gro $9.00
Paine, Diehl & Co.'s.....₩ gro $24.00
Silver & Co.....₩ doz $5.50

Culinary—
Keystone, P.D.&C., Each, No. 1, $1; No. 2, $2.....20%

Bells—

Cow—
Common Wrought.....60&10%
Western.....20&10%
Western, Sargent's list.....70&10%
Kentucky, "Star".....20&10%
Kentucky, Sargent's list.....70&10%
Kentucky Durham.....70&10
Dodge, Genuine Kentucky...70@70&10%
Texas Star.....50&10@50&10&5%
Call.....40@40&5%
Farm Bells.....₩ ℔ 3¢@3½¢
Steel Alloy Church and School Bells..40%

Door—
Gong, Abbe's.....33⅓&10%
Gong, Yankee.....45&10%
Gong, Barlow's.....25&10@50%
Crank, Taylor's.....25&10%
Crank Brooks'.....50&10&2%
Crank Cone's.....10%
Crank, Connel's.....20&10%
Lever, Sargent's.....60&10%
Lever, Taylor's Bronzed or Plated...net
Lever, Taylor's Japanned.....25&10%
Lever, R. E. M. Co.'s.....50&10&2%
Pull, Brook's.....50&10&2%
Pull, Western.....25&10%

Electric,
Wollensak's.....20%
Bigelow & Dowse.....20%
Taylor's.....20%

Hand—
Light Brass.....75&10%
Extra Heavy.....65&10%
White Metal.....60&10&10%
Silver Chime.....33⅓&10%
Globe Cone's Patent).....25&10@35%

Bellows—

Blacksmiths'.....60&5@65%
Molders'.....40@40&10%
Hand Bellows.....40&10@50%

Belting, Rubber—

Common Standard.....70@70&5%
Standard.....60&10&10@70%
Extra.....50&10@60%
N.Y.B.&P.Co., Carbon.....60%
N.Y.B.&P.Co., Diamond.....50%
N.Y.B.&P.Co., Para.....40%

Bench Stops—See Stops, Bench.

Benders, Upsetters, Tire.

Stoddard's Lightning Tire Upsetters..15%
Detroit Perfected Tire Bender.....15%

Bits—

Auger, Gimlet, Bit Stock, Drills, &c., see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—

Ordinary Tackle, list May 20, 1889.....70@70&5%
Cleveland Block Co., Mal. Iron.....50%
Moore's Novelty, Mal. Iron.....50%
Sure Grip Steel Tackle Blocks.....25%

Boards, Stove.

Wood Lined "Crystal".....50%
"Embossed".....50%
"Oxidized".....45%
Paper Lined Zinc.....55%
"Crystal".....55%
"Embossed".....55%
"Oxidized".....45%

Bolts—

Carriage, Machine, &c.—
Com. list June 10, '84.....75&10&2%
Genuine Eagle, list Oct., '84...75&10@80%
Phila. pattern, list Oct. 7, '84...80@80&10%
R.B.&W., old list.....70%
Machine, list Jan. 1, 1890.....75&10@75&10&5%
Bolt Ends, list Jan. 1, 1890.....75&10@75&10&5%

Door and Shutter—
Cast Iron Barrel, Square, &c..70@70&10%
Cast Iron Shutter Bolts.....70@70&10%
Cast Iron Chain (Sargent's list)....65&10%
Ives' Patent Door Bolts.....60%
Wrought Barrel.....70@70&10%
Wrought Square.....70@70&10%
Wr't Shutter, all Iron, Stanley's..60&10%
Wr't Shutter, Brass Knob.....40&10%
Wr't Shutter, Sargent's list.....60&10%
Wr't Sunk Flush, Sargent's list....55&10%
Wr't Sunk Flush, Stanley's list....50&10%
Wr't B.K.Flush. Com'n " ....55&10%

Stove and Plow—
Stove.....60%
Plow.....60&5%
R. B. & W., Plow.....55%

Tire—
Common, list Feb. 28, '83.....65%
Port Chester Bolt and Nut Company:
Empire, list Feb 28, '83.....65%
Keystone, Philadel., list Oct. '84....80%
Norway, Phila., list Oct. '84.....75%
American Screw Company:
Norway, Phil., list Oct. 16, '84.....75%
Eagle, Phil., list Oct. 16, '84.....80%
Philadel., list Oct. 16, '84.....80%
Bay State, list Feb. 28, '83.....65%
R.B.&W., Philadel., list Oct. 16, '84.....80%

Borers, Tap.

Common and Rind.....20&10%
Ive's Tap Borers.....33⅓&5%
Enterprise Mfg. Co.....20&10@30%
Clark's.....33⅓@35%

Borax.....₩ ℔ 9½@10½¢

Boring Machines—See Machines, Boring.

Bow Pins—See Pins, Bow.

Boxes, Wagon.

Per ℔.....2¾¢

Braces.

American Bit Brace Co.:
Nos. 10, 12, 20.....60&10%
Nos. 11, 21, 24, 27.....70&10%
Nos. 22, 23, 25.....60&10&5%
Nos. 13, 26, 36, 37.....70&10&5%
Ball Braces, net.....$1.12 to $1.25¢
Amidon's
Barker's Imp'd Plain.....75&10@80%
Barker's Imp. Nickeled.....65&10@70%
Ratchet.....75&10@80%
Eclipse Ratchet.....60%
Globe Jawed.....40@40&10%
Corner Brace.....40@40&10%
Universal, 8 in., $2.10 10 in.....$2.25
Buffalo Ball.....$1.10@$1.15
Barber's,
Nos. 10 to 16.....80%
Nos. 30 to 33.....80%
Nos. 40 to 63.....50&10%
Saxton's,
Barker's Imp. Polished.....75&10@80%
Barker's Imp. Nickeled.....65&10@70%
Ratchet, Polished.....50&10@60%
Ratchet, Nickeled.....40&10@50%
Buffalo Ball.....net, $1.10@$1.15
Bartholomew's,
Nos. 25, 27 and 30.....50&10@60&5%
Nos. 117, 118, 119.....70@70&5%
Common Ball, American.....$1.00@$1.10
Fray's Genuine Spofford's..50&5&50&10%
Fray's No. 70 to 120, 81 to 123, 207 to 414.....50&10%
Ives' New Haven Novelty.....70@70&5%
New Haven Ratchet.....60&5@60&10%
Barber Ratchet.....60&5@60&10%
Barbers.....60&5%
Spofford.....60&5@60&10%
Osgood's Ratchet.....40&10@50%
P. S. & W. Co., Peck's Patent.....60%

Brackets—

Shelf plain, Sargent list, 55&10@55&10&10%
Shelf, fancy, Sargent's list, 60&10@60&10&10%
Reading, plain.....50&10@60&10&5%
Reading, Rosette.....60&10@60&10&10%

Bright Wire Goods—See Wire.

Broilers—

Henis' Self-Basting. { Inch..... 9 10 9x11
Per doz ..$4.50 5.50 6.50
New Haven.....50%
Wire Goods Co.....65&10%

Buckets, Well.

Galvanized—
Hill's.....₩ doz, 12 qt, $4.25; 14 qt, $5.25
Iron Clad.....₩ doz. 14 qt, $4.25@$4.50
Helwig's Flat Iron Band.....$3.75
Helwig's Wired Top.....₩ doz $4.00

Bull Rings—See Rings, Bull.

Butchers' Cleavers—See Cleavers, Butchers'.

Butts—

Brass—
Wrought Brass.....75&10@80%
Cast Brass, Tiebout's.....50%
Cast Brass, Corbin's, Fast.....33⅓&10%
Cast Brass, Loose Joint.....33⅓&10%

Cast Iron—
Fast Joint, Narrow.....50&10&5@60%
Fast Joint, Broad.....60&10@80%

Loose Joint.	..70&10 @ 75%
Loose Joint, Japanned.	
Loose Joint, Jap. with Acorns.	
Parliament Butts.	
Mayer's Hinges	
Loose Pin, Acorns.	
Loose Pin, Acorns, Japanned.	
Loose Pin, Acorns, Japanned, Plated Tips.	

Wrought Steel—

Fast Joint, Narrow.	.70&10 @ 75%
Fast Joint, Lt. Narrow.	
Fast Joint, Broad.	
Loose Joint, Broad.	
Table Butts, Back Flaps, &c.	
Inside Blind, Regular.	
Inside Blind, Light.	
Loose Pin.	

Bronzed Wrought Butts.....40%

Calipers—See Compasses.

Cake, Tee—

Gautier, One Prong, Blunt.....8½@8¢
Burke's, One Prong, Blunt.....8½@8¢
Burke's, Two Prong, Blunt.....7½@8¢
Burke's, One Prong, Sharp.....8½@7¢

Can Openers—See Openers, Can.

Cards—List January 28, 1891.

Watson's Cotton, Wool, Horse and File.....25%

Carpet Stretchers—See Stretchers' Carpet.

Carpet Sweepers—See Sweepers, Carpet.

Cartridges—See Ammunition.

Casters—

Bed....	Brass	55@55&10%
Plate	Others	60@60&10%
Shallow Socket		

Deep Socket.....40&10%
Yale Casters, list May, 1884...80&10@40%
Yale, Gem.....60@60&5%
Martin's Patent (Phœnix).....45&10@50%
Payson's Anti-friction.....60@60&10%
Giant Truck Casters.....80%
Stationary Truck Casters.....80&10%
Socket Truck Casters.....50%

Cattle Leaders—See Leaders, Cattle.

Cement.

Victor Elastic.....5 ℔ pails ₩ ℔ 5¢

Chain—

Trace, Wagon and Fancy Chains, List revised April 21, 1890.....50&10@60%
American Coil, in cask lots,

3-16	¼	5-16	⅜	7-16	½	⅝	¾
$7.75	5.45	4.55	4.00	3.65	3.50	3.40	3.30

Less than cask lots, add ½@¾¢ ₩ ℔.
German Coil, list Oct. 6, 1890...60@60&5%
German Halter Chain, list Oct 6, 1890.....60@60&5%
Covert Halter.....60&5%
Covert Traces.....65&5%
Covert Heel Chain.....50&5%
Omeida Halter Chain.....60@60&5%
Galvanized Pump Chain.....₩ ℔ 5½@6¢
Jack Chain, Iron.....75&10@80%
Jack Chain, Brass.....75@75&10%

Chalk—

White, case lots.....₩ gr 50¢
Red, case lots.....₩ gr 67¢
Blue, case lots.....₩ gr 75¢
See also Crayons.

Chalk Lines—See Lines.

Chisels—

Socket Framing and Firmer.

P. S. & W.	.75 @ 75&10 %
New Haven.	
Witherby.	
Mix.	
Ohio Tool Co.	

Douglass.....75@75&5%
Buck Bros.....30%
Merrill.....60&10@60&10&5%
L. & I. J. White.....50@50&5%

Tanged and Miscellaneous.
Tanged Firmers.....40&10@50%
Butchers'.....$4.75@$5.00
Spear & Jackson's.....$5 to $
Buck Bros.....30%
Cold Chisels, ₩ ℔.....18&10%

Chucks—

Seach Pat.....each, $8.00.....20%
Morse's Adjustable,each, $7.00, 20@20&5%
Danbury.....each, $6.00, 30@30&5%
Syracuse, Bals Pat.....25%
Graham Patent.....83⅓&
Skinner's Patent Chucks.
Combination Lathe Chucks.....33⅓&
Universal Lathe Chucks.....40%
Independent Lathe Chucks.....40%
Drill Chucks.....15%
Union Mfg. Co.,
Victor.....$8.50, 25%
Combination.....40%
Universal.....40%
Independent.....40%

Churns.

Tiffin Union, each, 5 gal. $3.25; 7 gal., $3.75; 10 gal. $4.25.
McDermaid Star Barrel Churn, each, 6 gal., $2.60; 10 gal., $2.75; 15 gal., $3.00; 20 gal. $3.25.

Clamps—

R. I. Tool Co.'s Wrought Iron.....25%
Adjustable, Cincinnati.....15&10%
Adjustable, Hammers.....15%
Adjustable, Stearn's.....30@30&10%
Stearn's Adjustable Cabinet and Corner.....30@30&10%
Cabinet, Sargent's.....60&10%
Carriage Makers', Sargent's.....70&10%
Carriage Makers', P., S. & W. Co. 40&10%
Eberhard Mfg. Co.....40&5@40&10%
Parallel, C. H. Besly & Co.....25%
Warner's.....40&10@40&10&5%
Saw Clamps, see Vises. Saw Filers'.
Carpenters', Cincinnati.....25&10%

Cleavers.

Butchers'.

Bradley's.....35@30%
L. & I. J. White.....20&5%
Beatty's.....40@40&5%
New Haven Edge Tool Co.'s.....40%
P., S. & W.....33⅓&5@33⅓&10%
Foster Bros.....30%
Schulte, Lohoff & Co.....40@40&5%

Clips—

Norway, Axle, ¼ & 5-16.....55&5&5%
2nd grade Norway Axle, ¼ & 5-16 65&5%
Superior Axle Clips.....60%&5@70%
Norway Spring Bar Clips, 5-16..60&5&5%
Wrought-Iron Felloe Clips.....₩ lb, 5½¢
Steel Felloe Clips.....₩ lb, 5¢
Baker Axle Clips.....25%

Cloth and Netting, Wire—See Wire, &c.

Cockeyes.....50%

Cocks, Brass.

Hardware list.....50&2%

Coffee Mills—See Mills, Coffee.

Collars, Dog, &c.

Medford Fancy Goods Co.....40&10%
Embossed, Gilt, Pope & Steven's list 30&10%
Leather, Pope & Steven's list.....40%
Brass, Pope & Steven's list.....40%
Chapman Mfg. Company.....50&10@60%

Combs, Curry.

Fitch's.....50&10@50&10&10%
Rubber, per doz $10.00.....20%
Perfect.....50%
Kellogg's.....50&10
Sweet & Clark's.....50&10

Compasses, Dividers, &c.—

Compasses, Calipers, Dividers.70@70&10%
Bemis & Call Co.'s
Dividers.....60&5%
Compasses & Calipers.....50&5%
Wing and Inside or Outside.....50&5%
Double.....60%
(Call's Pat. Inside).....30%
Excelsior.....50%
J. Stevens & Co.'s.....25&10%
Starrett's
Spring Calipers and Dividers....25&10%
Lock Calipers and Dividers.....25%
Combination Dividers.....25%

Coopers' Tools—See Tools, Coopers'.

Cord—

Sash.

Common.....₩ lb 10@11¢
Patent, good quality.....₩ lb 13@13½¢
White Cotton Braided, fair..₩ lb 26@27¢
Common Russia Sash.....₩ lb 13½¢
Patent " .....₩ lb 15¢
Cable Laid Italian Sash.....₩ lb 22@23¢
Indian Cable Laid " .....₩ lb 18¢
Silver Lake—
A Quality, White, 50¢.....10&10&5%
A Quality, Drab, 55¢.....10&10&5%
B Quality, White.....28@30¢
B Quality, Drab.....31@33¢
C Quality, White (only).....26@27¢
Sylvan Spring, Extra Braided, White, 34¢
Sylvan Spring, Extra Braided, Drab..39¢
Semper Idem, Braided, White.....30¢
Egyptian, India Hemp, Braided.....25¢
Samson—
Braided, White Cotton, 50¢...30@30&5%
Braided, Drab Cotton, 55¢...30@30&5%
Braided, Italian Hemp, 55¢...30@30&5%
Braided, Linen, 80¢.....30@30&5%
Tate's Cot'n Braided, White, ₩ lb 50¢..40%
Tate's Cot'n Braided, Drab, ₩ lb 55¢..40%

Wire Picture.

Braided or Twisted.....75&10%

Corkscrews—See Screws, Cork.

Corn Knives and Cutters—See Knives, Corn.

Crackers, Nut—

Table (H. & B. Mfg. Co.).....40%
Blake's Pattern.....₩ doz $2.00, 10%
Turner & Seymour Mfg. Co.....50%

Cradles—

Grain.....50&5&2@50&10&2%

Crayons.

White Crayons, ₩ gross.....10¢
D. M. Stewart Mfg. Co., Metal Workers, ₩ gr, $2.50.....25%
D. M. Stewart Mfg. Co., Rolling Mill, ₩ gr, $2.50.....25%
See also Chalk.

Crow Bars—See Bars, Crow.

Curry Combs—See Combs, Curry.

Curtain Pins—See Pins Curtain.

Cutters—

Meat.

Dixon's ₩ doz.....40&5%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$20.00

Woodruff's ₩ doz.....40&5%

Nos.	100	150
	$15.00	$18.00

Hales Pattern ₩ doz.....70@70&5%

Nos.	11	12	13
	$27.00	$33.00	$45.00

American.....30%

Nos.	1	2	3	4	B	5
Each	$5	$7	$10	$25	$50	$60

Enterprise.....30%

Nos.	10	12	22	32	42
Each	$3	$3.50	$4	$6	$15

Great American Meat Cutter.....30%

Nos.	112	116	118	120	122
Each	$2.00	$2.75	$3.00	$3.50	$4.00

Miles' Challenge ₩ doz.....45@45&10%

Nos.	1	2	3
	$22.00	$30.00	$40.00

Home No. 1.....₩ doz, $26.00, 55&10%
Draw Cut, each:

Nos.	5	2	6	8
	$50	$75	$80	$225

Great American.....30%
Beef Shavers (Enterprise).....20&10@30%
Little Giant.....50%
Chadborn's Smoked Beef Cutter, ₩ doz $66.00

Tobacco.

Champion.....20&10@30%
Wood Bottom.....₩ doz $5.00@$5.25
All Iron.....₩ doz $4.25
Nashua Lock Co.'s..₩ doz, $35.00 50@55%
Wilson's.....55%
Sargents's.....₩ doz, $24, 55&10%
Acme.....₩ doz $20.00, 40%

Washer.

Smith's Pat.....₩ doz $12.00, 20&10&10%
Johnson's.....₩ doz $11.00, 33⅓&
Penny's.₩ doz Pol. $16; Jap'd, $16.00, 55%
Appleton's.....₩ doz $16.00, 60&10%
Bonney's.....30&10%
Cincinnati.....25&10%

Dampers, &c—

Dampers, Buffalo.....40&10%
Buffalo Damper Clips.....40&10%
Crown Damper.....40%
Excelsior.....40&10%

Diggers, Post Hole, &c.—

Samson Post Hole Digger, ₩ doz $36.00, 25%
Fletcher Post Hole Augers, ₩ doz $36, 20%
Eureka Diggers.....₩ doz $12.50@14.00
Leed's.....₩ doz $8.00@9.00
Vaughan's Post Hole Auger, ₩ doz $13.00@14.00
Kohler's Little Giant.....₩ doz. $18.00
Kohler's Hercules.....₩ doz. 15.00
Kohler' New Champion.....₩ doz. $9.00
Schniedler.....₩ doz. $18.00
Ryan's Post Hole Diggers..₩ doz $24.00
Cronk's Post Bars, ₩ doz $60.00, 50&5@50&10%
Gibbs Post Hole Digger, ₩ doz $30.00, 50¢
Imperial, ₩ doz $15.....45%

Dividers—

See Compasses.

Dog Collars—See Collars, Dog, &c.

Door Springs—See Springs, Door.

Drawers.

Money, ₩ doz.....$13&$10

Drawing Knives—See Knives, Drawing.

Drills and Drill Stocks—

Blacksmiths'.....each $1.75
Blacksmiths' Self-Feeding, each $7.50,20%
Breast, P. S. & W.....40&10%
Breast, Wilson's.....30&5%
Breast, Millers Falls.....each $3.00, 25%
Breast, Bartholomew's....each $2.50, 25&10@40%
Ratchet, Merrill's.....20@20&5%
Ratchet, Ingersoll s.....25%
Ratchet, Parker's.....20@20&5
Ratchet, Whitney's.....20&10%
Retchet, Weston's.....20@25%
Ratchet, Moore's Triple Action..25@30%
Ratchet, Curtis & Curtis.....30%
Whitney's Hand Drill, Plain, $11.00; Adjustable, $12.00.....20&10%
Wilson's Drill Stocks.....10%
Automatic Boring Tools.....$1.75@$1.85

Twist Drills—

Morse.....50&10&5%
Standard.....50&10&5%
Syracuse (Metal list).....50&10%
Cleveland.....50&10&5%
Williams.....50&10&10%
New Process.....50&10&5%
Graham's Pat. Groove Shank 50&10&5%

Drill Bits.—See Augers and Bits.

Drill Chucks.—See Chucks.

Dripping Pans-See Pans, Dripping.

Drivers, Screw.

Douglas Mfg. Co.....20@20&10%
Disston's.....60%
Buck Bros.....30%
Stanley R. & L. Co.'s
Varnished Handles.....65&10%
Black Handles.....60&10%
Sargent & Co.'s
No. 1 Forged Blade.....60&10&10%
Nos. 20, 30 and 60.....60%&10&10%
P. S. & W.....70%
Knapp & Cowles:
No. 1.....60&10@70%
No. 2.....60&10&10@70&5%
No. 3.....60&5@60&10%
Nos. 4 and 00, Acme and Ideal..50& 5@50&10&5%
Stearns'.....25&10&5%
Gay & Parsons.....35%
Champion.....25&10%
Clark's Pat.....30@35%
Crawford's Adjustable.....30%
Ellrich's Socket and Ratchet..25@25&10%
Allard's Spiral, new list.....25%
Kolb's Common Sense ₩ doz $6.00,25&10%
Syracuse Screw-Driver Bits...30&30&5%
Screw-Driver Bits.....₩ doz. 50@75¢
Screw-Driver Bits, Parr's.....₩ gro $6.25
Fray's Hol. Hdle. Sets. No. 3. $12.00, 25@25&10%
P. D. & Co.'s all Steel.....50%
Cincinnati.....25&10%
Brace Screw Drivers.....25&10%
Buck Bros.' Screw-Driver Bits ....

Egg Beaters.—See Beaters, Egg.

Egg Poachers.—See Poachers, Egg.

Electric Bell Sets.—See Bells, Electric.

Emery. — No. 4 to No. 54 to Flour, CF

	46 gr.	150 gr.	F. FF.
Kegs, ₩ lb	4½¢	5 ¢	2½¢
½ kegs, ₩ lb	4¾¢	5¼¢	2¾¢
¼ kegs, ₩ lb	5 ¢	5½¢	3 ¢
10-lb cans, 10 in case	6 ¢	6¼¢	5 ¢
10-lb cans, less than 10	10 ¢	10 ¢	7½¢

Enameled and Tinned Ware—See Ware, Hollow.

Escutcheon Pins—See Pins, Escutcheon.

Escutcheons.

Door Lock....Same dis as Door Locks.
Brass Thread.....60@60&10%
Wood.....25%

Expanded Metal.

List No. 5.

Lathing.....10%
Fencing, Painted Sheets.....20%
Netting, Painted Sheets.....20%
Door Mats, Galvanized.....25%
Window Guards, Paneled.....15%
Tree Guards, Paneled.....15%

Fasteners, Blind—

Mackrell's, ₩ dos. $1.00.....20@20&10%
Van Sand's Screw Pat., $15 ₩ gr..60&10%
Van Sand's Old Pat., $15.00 ₩ gr..55&10%
Washburn's Old Pattern, ₩ gr.....$9.00
Merriman's.....new list
Austin & Eddy No. 2003 ₩ gr.....$9.00
Security Gravity, ₩ gr.....$9.00

Faucets.—

Fenn's.....40%
Bohren's Pat. Rubber Ball.....25%
Fenn's Cork Stops.....33⅓&
Star.....60%
Frary's Pat. Petroleum.....40&5&2%
B. & L. B. Co.
West's Lock, Open and Shut Key...50%
Star, Metal Plug, new list.....40%
Lockport, Metal Plug, reduced list..60%
Metallic Key, Leather Lined....60&10@
60&10&10%
Cork Lined.....70&5@70&10%
Burnside's Red Cedar.....50%
Burnside's Red Cedar, bbl lots....50&10%
John Sommers'
Peerless Best Block Tin Key.....40%
IXL, 1st quality, Cork Lined.....50%
Diamond Lock.....40%
Perfection, Fla. Red Cedar.....60%
Goodenough Cedar.....50%
Boss Metallic Key.....50%
Reliable Cork Lined.....60%
Western Pattern Cork Lined.....50%
Self-Measuring
Enterprise, ₩ doz $50.00.....20&10%
Lane's, ₩ doz $36.00.....25&10%
Victor, ₩ doz $36.00.....25&10%

Felloe Plates—See Plates, Felloe.

Fifth Wheels.—

Derby and Cincinnati.....45&5%
Brewster.....50&5%

Files—

Domestic—

Nicholson Files, Rasps, &c.....
60&10@60&10&5%
Nicholson (X. F.) Files.....25%
Nicholson's Royal Files (Seconds).....75%
(extra prices on certain sizes)
G. & H. Barnett (Black Diamond).....
60&10@60&10&5%
Eagle.....60&10&5@60&10&10%
Other makers, best brands60&10@60&20%
Fair brands.....60&10&10@70&5%
Second quality.....70&10@75&10%
Heller's Horse Rasps.....50&7½@50&10%
McCaffrey's Horse Rasps.....50&10%
Chelsea Horse Rasps, Hand Cut...50&10%

Imported—

Moss & Gamble....List, April 1, 1883, 15%
Butcher.....Butcher's list, 20%
Stubs.....Stubs list, 25@30%
Turton's.....Turton's list, 20@25%
Greaves' Horse Rasps..American list, 60%

Fixtures.

Grindstone—

Sargent's Patent.....70&10%
Reading Hardware Co.....30&10%
P., S. & W. Co.....50&10%

Fluting Machines—See Machines, Fluting.

Fluting Scissors—See Scissors, Fluting.

Fodder Squeezers—See Squeezers, Fodder.

Forks—

Hay, Manure, &c., Asso List..65&5@65&10%
Hay, Manure, &c., Phila. List. 60@60&5%
Plated, see Spoons.

Frames—

Saw—

White Vermont.....₩ gro $9.00@10.00
Red, Polished and Varnished.....₩ doz $1.50, 25%

Screen, Window and Door—

Porter's Pat. Window and Door Frame. 33⅓&10%
Warner's Screen Corner Irons..33⅓@ 33⅓&10%
Stearns' Frames and Corners..25&25&10%
Cortland.....40@40&5%

Freezers, Ice Cream—

White Mountain.....60@60&5%
Granite State.....65@65&5%
Arctic.....70@70&5%
American.....60%
Buffalo Champion.....65@65&5%
Shepard's Lightning.....65@65&5%
Gem.....6 %
Blizzard.....70%
Double Action Crown.....60%
Crown.....60%
Star.....60%
Peerless.....60&10%
Giant.....60%
Zero.....60&10&10%
Boss and Pet.....6 &10&10&10%
Keystone, P. D. & Co., each, $1.50.... 20%

Fruit and Jelly Presses—See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.

Funnels.

Gersdorff's Perfection, Standard and Globe; *Tin*, 1 gro., 10 %; 2 to 5 gro., 20 %; 5 to 10 gro.....30 %
Copper, 1 to 6 doz., 15 %; 8 to 12 doz., 20 %; over 12 doz.....25 %

Furnaces, Soldering.

Burgess No. 3 Gem, tin reservoir....$7.00
Burgess No. 3 Gem, copper reservoir, 8.50

Fuse— ₩ 1000 ft.

Common Hemp Fuse, for dry ground.$2.70
Common Cotton Fuse, for dry ground 2.85
Single Taped Fuse, for wet ground.. 3.85
Double Taped Fuse, for very wet gr. 4.85
Triple Taped Fuse, for very wet gr.. 5.60
Small Gutta Percha Fuse, for water. 7.50
Large Gutta Percha Fuse, for water.13.00

Gates, Molasses—

Stebbin's Pattern.....75&10&5@30%
Stebbin's Genuine.....60&10&10%
Stebbin's Tinned Ends.....40&10%
Chase's Hard Metal.....50&10%
Bush's.....30%
Lincoln's Pattern.....70@70&10%
Weed's.....30&10%
Boss, ₩ doz:
No. 1, $7; No. 2, $8; No. 3, $9; No. 4, $10.....60&10&10%

Gauges.

Marking, Mortise, &c.....60&10%
Starrett's Surface, Center and Scratch. 25&10%
Wire, low list.....10&10%
Wire, Wheeler, Madden & Co.....10%
Wire, Morse's.....25%
Wire, Brown & Sharpe's.....10@20%
Wire, P. S. & W. Co.....10&10%

Gimlets—

Nail and Spike.....50&10&5%
"Eureka" Gimlets.....40&10%
"Diamond" Gimlets.....₩ gr $5.00
Double Cut, Shepardson's.....45@45&5%
Double Cut, Ives'.....60@60&5%
Double Cut, Douglass'.....40&10%
"Bee," ₩ gr $12.....35@35&5%

Glue—

Le Page's Liquid.....25@25&5%
Upton's Liquid.....35%
Improved Process.....25@25&5%

Glue Pots—See Pots, Glue.

Grease, Axle.

Fraser's.....Keg ₩ lb 4¢, Pail ₩ lb 5¢
Fraser's, in boxes.....₩ gr $5.50
Dixon's Everlasting, in bxs...₩ doz 1 lb $1.20; 2 lb $2.00
Dixon's Everlasting....10-lb pails, ea. 36¢
Lower grades, special brands, ₩ gr $5.50@$7.00

Grindstones—

Small, at factory.....₩ ton $7.50@9.00
Family, Cleveland Stone Co.....20 %

Grindstone Fixtures—See Fixture', Grindstone.

Hack Saws—See Saws.

Hafts, Awl.

Sewing, Brass Fer. ₩ gr, $3.50.....45&10%
Pat. Sewing, Short..$1.00 ₩ doz.....40&10%
Pat. Sewing, Long.....₩ doz $1.20
Pat. Peg, Plain Top..₩ gr $10.00...45&10%
Pat. Peg, Leather Top..₩ gr $12.00.45&10%

Halters.

Covert's, Rope, ½-in. Jute..... 50&2%
Covert's, Rope, ½-in. Hemp .....50&2%
Covert's Adj. Rope Halters .....40&2%
Covert's Hemp Horse and Cattle Tie, 50&2%
Covert's Jute Horse and Cattle Ties, 50&10&2%
Covert's Adj. Web Halters .....35&2 %

Hammers—

Handled Hammers—

Maydole's, list Dec. 1, '85.....25&10@
Buffalo Hammer Co.....
Humason & Beckley.....
Atha Tool Co.....50@50&10%
Fayette R. Plumb.....
C. Hammond & Son.....
Verree.....
Hartford, Nail Hammers.....40&2%
Hartford, Machinists, &c...50&2&50&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, L50 & 1.75.....30&10%
Nelson Tool Works.....40&10%
Warner & Nobles.....30@35
Peck, Stow & Wilcox.....40%
Sargent's.....33⅓&10%

Heavy Hammers and Sledges—

3 lb and under.....₩ 40¢
3 to 5 lb.....₩ 35¢ } 70@70&10%
Over 5 lb.....₩ 30¢
Wilkinson's Smiths.....10½¢@11½¢₩ lb

Handcuffs and Leg Irons—See Police Goods,

Handles—

Atkins' No. 1 Loop, ₩ pair, 25¢; No. 13¢; No. 6, 10¢; No. 2 and No. Reversible, 18¢.

Cross-Cut Saw Handles—

Boynton's Loop Saw Handles, 50¢....60%
Champion.....15¢

Iron, Wrought or Cast—

Door or Thumb.

Nos.	0	2	3
Per doz.	$0.90	1 00	1.15 1.35 1.80

60&10&1 %

Boggin's Latches.....₩ doz 30@35¢
Bronze Iron Drop Latches..₩ doz 70¢ net
Jap'd Store Door Handles—Nuts, $1.62; Plate, $1.10; no Plate, $0.88 ..... net
Barn Door, ₩ doz $1.40.....10&10%
Chest and Lifting.....70%

Wood—

Saw and Plane.....40&10@40&10&5%
Hammer, Hatchet, Axe, Sledge, &c...40%
Brad Awl.....₩ gr $2.00
Hickory Firmer Chisel, ass'd. ₩ gr 4.50
Hickory Firmer Chisel, large. ₩ gr 5.00
Apple Firmer Chisel, ass'd....₩ gr 5.00
Apple Firmer Chisel, large...₩ gr 6.00
Socket Firmer Chisel, ass'd...₩ gr 3.00
Socket Framing Chisel, ass'd. ₩ gr 5.00
I. S. Smith & Co.'s Pat File.....50
File, assorted.....₩ gr 7 75
Auger, assorted.....₩ gr 5.00 } 50%
Auger, large.....₩ gr 7.00 }
Pat. Auger, Ives'.....20&10%
Pat. Auger, Douglass.....₩ set $1.25
Pat. Auger, Swan's.....₩ set $1.00
Hoe, Rake, Shovel, &c. .....50@10%

Hangers—

Barn Door, old patterns...60&10&10@70%
Barn Door, New England...60&10&10@70
Samson Steel Anti-Friction.....55%
Orleans Steel.....55%
Hamilton Wrought Wood Track.....55%
U. S. Wood Track.....65%
Champion.....60&10%
Rider and Wooster, Medina Mfg. Co.'s list.....70%
Climax Anti-Friction.....55%
Climax Anti-Friction for Wood Track55%
Zenith for Wood Track.....55%
Reed's Steel Arm.....50%
Challenge, Barn Door.....50%
Sterling.....50@50&10%
Victor, No. 1, $15.00; No. 2, $16.50; No. 3, $18.00.....50&2%
Cheritree.....50&10%
Kidder's.....50&10@60%
The Boss.....60&10%
Best Anti-Friction.....60&10%
Duplex (Wood Track).....60&10&5%
Terry's Pat., ₩ doz pr. 4 in, $10.00; 5 in. $12.00.....50&10%
Terry's Steel Anti-Friction Leader 50&10%
Terry's Steel Anti-Friction Ideal..50&10%
Cronk's Patent, Steel Covered.....50@5%
Wood Track Iron Clad, ₩ ft. 10¢.....50 &15@60%
Carrier Steel Anti-Friction.....50&10%
Architect, ₩ set $6.00.....20%
Eclipse.....20&10%
Felix, ₩ set $4.50.....20%
Richards'.....30@30&10%
Lane's Standard.....50&5@50&10%
Lane's New Standard.....50@50&5%
Ball Bearing Door Hanger..20&10@25&10%
Warner's Pat.....20&10@20&10&10%
Stearns' Anti-Friction.20&10@20&10&10%
Stearns' Challenge.....25&10@25&10&10%
Faultless.....40@40&5%
American, ₩ set $6.00.....20&10%
Rider & Wooster, No. 1, 65¾¢; No. 2, 75¢.....40%
Paragon, Nos. 1, 2 and 3.....40&10%
Cincinnati.....25&10%
Paragon, Nos. 5, 5¼, 7 and 8.....20&10%
Crescent.....60@60&10%
Nickel Cast Iron.....50%
Nickel, Malleable Iron and Steel.....40%
Scranton Anti-Friction Single Strap33⅓%
Wild West, 4 in. Wheel, $15.00; 5 in. Wheel, $21.00.....45%
Star.....40&10@40&10&5%
May.....50&5@50&10%
Barry, $6.00.....40&10%
Interstate.....50%
Magic.....45%

Harness Snaps—See Snaps.

Hatchets—

American Axe and Tool Co.
Blood's
Hunt's
Hurd's
Mann's
Peck's
Underhill's } 40 & 10 @ 50&5 %
Buffalo Hammer Co.
Fayette R. Plumb.
C. Hammond & Son...
Kelly's.
Sargent & Co.
P., S. & W. Co.
Ten Eyck Edge Tool Co.
Collins.....10%
Schulte, Loboff & Co.....50@50&5%

Hay and Straw Knives—See Knives.

Hinges—

Blind Hinges—

Parker.....75&2%
Palmer.....50&5&10%
Seymour.....70&2%
Huffer.....50%
Clark's, Nos. 1, 3, 5, 40 and 50 75&10&5@80%
Clark's Mortise Gravity.....50%
Sargent's, Nos. 1, 3, 5, 11, 18 75&10@55&10&5%
Sargent's, No. 12.....77&10&10%
Reading's Gravity.....75&10@75&10&5%
Shepard's
Noiseless.....75&10%
Niagara.....80%
Buffalo.....80%
Clark's Genuine Pattern.....80%
O. S., Lull & Porter.....75&10%
Acme, Lull & Porter.....75%
Queen City Reversible...70&10&5@75%
Clark's Lull & Porter, Nos. 0, 1, 1½, 2, 2½, 3.....75&10&2½%
North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%

Gate Hinges—

Western.....₩ doz $4.40, 60%
N. E.....₩ doz $7.00, 55%
S. E. Reversible.....₩ doz $5.20, 55&10%
Clark's, Nos. 1, 2, 3.....60&10&5%
N. Y. State.....₩ doz $5.00, 55&10%
Automatic.....₩ doz $12.50, 50%
Common Sense.....₩ doz pair $4.50, 50%
Seymour's.....45&10%
Shepard's.....60&10&5%
Reed's Latch and Hinges. ₩ doz $12.00, 50%

Spring Hinges—

Union Spring and Blank Butts.....40%
Lear's Spring Hinge Co.'s list, March 1888.....20%
Acme.....30%
J. S.....25&10%
Empire and Crown.....20%
Vero and Monarch.....55%
American, Gem, and Star.....20%
Oxford.....20%
Barker's Double Acting.....25%
Union Mfg. Co.....25%
Bommer's.....30%
Suckman's.....15@20%
Chicago.....30%
Wiles'.....10%
Devore's.....40%
Rex.....40%
Royal.....60%
Reliable.....60%
Champion.....60%
Bardsley's Patent.....40%
Stearn's.....50&10%
Niagara, Holdback pattern, per gross.....$14.00

Wrought Iron Hinges
List February 14, 1891.
Strap and T.....50&10%
Corrugated Strap and T.....50 & 10 %
Screw Hook and Strap. { 6 to 12 in., ₩ ℔. 4¢ / 14 to 20 in., ₩ ℔.3½¢ / 22 to 36 in., ₩ ℔. 3¢
Screw Hook and Eye. { ⅛ in., ₩ ℔ 7½¢ / ⅝ in., ₩ ℔ 5½¢ / ¾ in., ₩ ℔ 4½¢
Rolled Blind Hinges, Nos. 32 and 34 50&10%
Rolled Blind Hinges, Nos. 232 and 234 55&10%
Rolled Plate.....70&10%
Rolled Raised.....70&10%
Plate Hinges { 8, 10 & 12 in., ₩ ℔.....5¢ / "Providence" { over 12 in., ₩ ℔.....4¢
Hoes—

Eye—

D. & H. Scovil.....20%
Lane's Crescent Planters Pattern..45&5%
Lane's Razor Blade, Scovil Pattern...30%
Maynard, S. & O. Pat.....45&5%
Sandusky Tool Co., S. & O. Pat. } 50&10&5 @60%
Am. Axe and Tool Co., S. & O. Pat. }
Chattanooga Tool Co., S. & O. Pat..60& 5@60&10%
Grub.....60&10%

Handled—

Garden, Mortar, &c.....65&5@65&10%
Planter's, Cotton &c.....65&5@65&10%
Warren Hoe.....60%
Magic .....₩ doz $4.00

Hog Rings and Ringers—See Rings and Ringers.

Hoisting Apparatus—See Machines, Hoisting.

Hollow-Ware—See Ware, Hollow.

Holders.

Bag.

Sprengle's Pat.....₩ doz $18.....60%

Bit.

Extension.
Barber's, ₩ doz $15.00.....40@40&10%
Ives, ₩ doz $20.00.....60&5@60&10%
Dingonal.....₩ doz $24.00, 40%
Angular.....₩ doz $24.00, 40&5%

File and Tool—

Bals Pat.....₩ doz $4.00; 25%
Nicholson File Holders.....20%
Dick's Tool Holder.....20%

Hooks—

Cast Iron—

Bird Cage, Sargent's list.....
Bird Cage, Reading..... } 60&10&10%
Clothes Line, Sargent's list..
Clothes Line, Reading list. 60&10@60&10&10%
Ceiling Sargent's list.....55&10&10%
Harness, Reading list..55&10@55&10&10%
Coat and Hat, Sargent's list. Coat and Hat, Reading .50&10@50&10&10%

Wrought Iron—

Cotton.....₩ doz $1.25
Cotton Pat. (N.Y. Mallet & Handle W'ks). 30%
Tassel and Picture (T. & S. Mfg. Co.)..50%
Wrought Staples, Hooks, &c. See Wrought Goods.

Wire—

Wire Coat and Hat, Gem, list April, 1886.....60%
Wire Coat and Hat, Miles', list April, 1886.....50%
Indestructible Coat and Hat.....45%
Wire Coat and Hat, Standard.....60%
Handy Hat and Coat.....50&10%
Steady Ceiling Hooks.....50&10%
Belt.....80@80&10%
Atlas, Coat and Hat.....60%

Miscellaneous.

Grass, No. 2, $2.00; No. 3, $2.25; No. 4, $2.50
Nolin's Grass.....₩ doz $2.25
Bush.....55@60%
Whiffletree—Patent.....55%
Hooks and Eyes—Malleable Iron. 70@70&10%
Hooks and Eyes—Brass.....60&10&10%
Fish Hooks, American.....50%
Bench Hooks .....See Bench Stops.

Horse Nails—See Nails, Horse.

Horse Shoes—See Shoes, Horse.

Hose, Rubber—

Competition.....75@75&5%
Standard.....60&10&5@60&10&10%
Extra.....50&10@60%
N. Y. B. & P. Co., Para.....25&5%
N. Y. B. & P. Co., Extra.....40@40&5%
N. Y. B. & P. Co., Dundee...50&10 @ 60%

Huskers—

Blair's Adjustable.....₩ gr $8.00
Blair's Adjustable Clipper...₩ gr 7.00
Hubbard's Solid Steel.....₩ gr 4.50

Indurated Fiber-Ware—See Ware, Indurated Fiber.—

Irons.

Sad—

From 4 to 10, at factory ...₩ 100 ℔, $2.30@$2.40
Self-Heating.....₩ doz $9.00 net
Self-Heating, Tailors'....₩ doz $18.00 net
Mrs. Pott's Irons.....50&5%
Enterprise Star Irons.....50&5%
XX Cold Handle Sad Irons.....50&5%
Ideal Irons new list..50&10@50 & 10&10%
Salamander, Irons.....25%
B. B. Sad Irons, ₩ ℔.....3 @3½¢
Combined Fluter and Sad Iron, ₩ doz, $15.00.....15%
Fox Reversible, Self-Fluter ₩ doz $24.00
Chinese Laundry (N.E. Butt Co.) 8½¢, 15%
New England.....5¢, 15%
Mahony's Troy Pol. Irons.....25%
Sensible, list Jan. 91.....50&10&5%
Sensible Tailor's Irons.....33⅓%
National Self-Heating.....30%

Soldering—

Soldering Coppers.....₩ ℔ 22 @ 23¢
Covert's Adjustable, list Jan. 1 1886. 35&2%

Irons, Pinking, per doz., 65¢.

Jack Screws—See Screws.

Jacks, Wagon.

Daisy.....33⅓%
Victor.....33⅓%

Kettles—

Brass, Spun, Plain, list Jan. 1, '91..25&5%
Brass, Spun, Pig.W.M.list Jan. 1, '91..20%
Enameled and Tea—See Hollow Ware.

Keys—

Lock Asso'n list Dec. 30, 1886...50&10@ 60&5%
Eagle, Cabinet, &c .....33⅓&2%
Hotchkiss' Brass Blanks.....40%
Hotchkiss, Copper and Tinned.....40%
Hotchkiss' Pad. and Cab.....35%
Ratchet Bed Keys.....₩ doz $4.00, 15%
Wollensak Tinned.....50&10%

Knife Sharpeners—See Sharpeners, Knife.

Knives.

Butcher, Shoe, &c—

Wilson's Butcher Knives, List Dec. 8, 1890.....25%
Ames' Butcher Knives.....25%
Foster Bros.' Butcher, &c.....40%
Jordan's A.A.A.I. Butchers', list.....net
Nichols' Butcher Knives.....40&10%
W. W. Wilson, Butcher, 6 in., $2.00; 7 in., $2.70; 8 in., $3.80, &c.
Ames' Shoe Knives.....20@25%
Ames' Bread Knives. ₩ doz $1.50, 15@20%
Moran's Shoe and Bread.....20%
Hay and Straw.....See Hay Knives.
Table and Pocket.....See Cutlery.
Corn, Auburn Mfg. Co. Western Pat., $2.00
Corn Auburn Mfg. Co. Crescent.....$3.50

Corn—

Bradley's.....10%
Wadsworth's.....25%

Drawing—

Witherby } .75 @ 75&10 %
P. S. & W. }
Mix }
New Haven }
Merrill.....60&10@60&10&5%
Douglas.....75@75&5%
Watrous.....15&10@25%
L. & I. J. White.....20&5%
Bradley's.....25%
Adjustable Handle.....25@33⅓%
Wilkinson's Folding.....25@25&5%

Hay and Straw—

Lightning, Mfrs' price ₩ doz $18.00, 25% But jobbers cut this price freely, often selling at $8 @ $8.50.
Wadsworth's.....40&7½@40&10%
Carter's Needle.....₩ doz $11.00@$11.50
Heath's.....₩ doz $13.00@13.50
Auburn Hay, Corn. and Spear Point..50%
Auburn, Straw.....40%
Nolin's Hay .....₩ doz. $7.00 @ $8.00

Mincing.

Am. (3d quality), ₩ gr., 1 blade, $7; 2 blades, $12; 3 blades, $18.....net
Lothrop's.....20&10%
Smith's, ₩ doz, Single, $2.00; Double, $3 40@45%
Knapp & Cowles.....50&10@60%
Buffalo Adjustable.....₩ doz $8.00 .25%
Buffalo Double Adj'table.₩ doz $3.00 25%

Knobs—

Door Mineral.....60@65%
Door Por. Jap'd.....70@75%
Door Por. Nickel.....$2.00@2.25
Door Por. Plated, Nickel.....$2.00@2.25
Drawer, Porcelain.....60@60&10@10&10%
Hemacite Door Knobs.....40&10@50%
Yale & Towne Wood, list Dec., 1885...40%
Furniture Plain.....75¢ gro inch, 10%
Furniture, Wood Screws.....35&10%
Base, Rubber Tip.....70&10&5%
Picture, Judd's.....60&10&10@70%
Picture, Sargent's.....70&10%
Picture, Hemacite.....35&5%
Shutter, Porcelain.....65&10%
Carriage, Jap.....₩ gro 80¢, 60&10%
Bardsley's Wood Door, Shutter, &c..40%

Ladies.—

Melting, Sargent's.....55&10%
Melting, Reading.....35&10%
Melting, Monroe's Pat...₩ doz $4.00, 40%
Melting, P. S. & W.....35&10@40%
Melting, Warner's.....80%

Lanterns—

Tubular—

Plain with Guards, ₩ doz.....$3.75@4.00
Lift Wire, with Guards.....$4.00@4.25
Square Plain, with Guards.....$3.75@4.00
Sq. Lift Wire, with Guards.....$4.50

Police Lanterns (including packages).

2¾-inch Bull's-eye Police regular. ₩ doz $3.80
3-inch Bull's-eye Police regular. ₩ doz $3.90
2¾-inch Bull's-eye Police flash light. ₩ doz $4.00
3-inch Bull's-eye Police flash light. ₩ doz $4.50

Lawn Mowers—See Mowers, Lawn.

Leaders, Cattle.

Humason. Beckley & Co.'s.....70%
Sargent's.....65%&10%
Hotchkiss.....30%
Peck, Stow & W. Co.....60&10%

Lemon Squeezers—See Squeezers, Lemon.

Lifters, Transom.

Wollensak's:
Class 3 and 4, Bronzed Iron.....60%
Class 3 and 4, Bronze Metal.....25%
Class 3 and 4, Brass.....35%
Skylight Lifters.....85%
Crown, Eagle and Shield.....50%
Reiher's, list Feb. 20, 1891.
Bronzed Iron Rods.....50&10&10&2%
Brass, Real Bronze or Nickel Plate..30%
Excelsior.....50&10&2%
Shaw's.....50&10%
Payson's:
Universal.....60%
Solid Grip.....60%
Imperial.....50&10%

Lines—

Cotton and Linen Fish, Draper's.....50%
Draper's and Tate's Chalk.....60%
Draper's Masons' Linen, 84 ft., No. 1, $1.25; No. 2, $1.75; No. 3, $2.25; No. 4, $2.75; No. 5, $3.25.....25%
Cotton Chalk.....50%
Samson Cotton, No. 4, $2; No. 4½, $2.50; 10%
Silver Lake, Braided, No. 30 0; No. 1, $6.50; No. 2, $7.00; No. 3, ..50 ₩ gro.....25%
Mason's Linen, No. 3½, $1.50; No. 4, $2.00; No. 4½ $2.50.
Mason's Colored Cotton.....45%
Wire Clothes.. Nos. 12 16 20
100 ft. $4 00 $3 50 $3.00
Ventilator Cord, Samson Braided, White or Drab Cotton..₩ doz $7.50, 20%

Locks, &c.—

Cabinet—

Eagle, Gaylord Parker and Corbin... } List March, '84, rev Jan.1,'85..33⅓&2%
Deitz, Nos. 36 to 39.....40%
Deitz, Nos. 51 to 63.....40&10%
Deitz, Nos. 86 to 90.....30%
Stoddard Lock Co.....30&33⅓%
"Champion" Night Latches.....40%
Barnes Mfg. Co.....40@40&10%
Eagle and Corbin Trunk.....25&2%
"Champion" Cab. and Combin...33⅓%
Yale.....net prices
Romer's.....25%

Door Locks, Latches, &c.

R. & E. Mfg. Co. list Mar. 20, 1889. } 65&10@70% Much lower net prices often made.
Mallory, Wheeler & Co., list July, '88.....
Sargent & Co., list Aug. 1, '88
Reading Hardware Co., list Feb. 2, '85.....
Brittan, Graham & Mathes, list Jan. 1890.....60&10&10%
Perkins' Burglar Proof.....60&25%
Plate.....33⅓&2%
Barnes Mfg. Co.....40@40&10%
Yale.....net prices
Deitz Flat Key.....30%
L. & C. Round Key Latches.....30&10%
L. & C. Flat Key Latches.....33⅓&10%
Romer's Night Latches.....15%
Brooklyn Latches.....50&10%
Shepardson or U. S.....35%
Seed's N. Y. Hasp Lock.....25%

Padlocks—

List Dec. 23, '84.....75&10%
Brittan, Graham & Mathes.....75&10%
Yale Lock Mfg. Co.'s.....net prices
Eagle.....25&2%
Eureka, Eagle Lock Co.....40&2%
Romer's, Nos. 0 to 91.....50%
Romer's Scandinavian, &c., Nos. 100 to 500..15%
A. E. Deitz.....40%
Champon Padlocks.....40%
Hotchkiss.....30%
Star.....45%
Horseshoe.....₩ doz, $9. 40@40&10%
Barnes Mfg. Co.....40@40&10%
Nock's.....30%
Brown's Pat.....25%
Scandinavian.....90@90&10%
E. T. Fraim's Keystone Scandavian. Nos. 119, 120, 130 and 140.....90&10% Other Nos.....60%
Ames Sword Co. up to No. 150.....40%
Ames Sword Co. above No. 150.....50%
Slaymaker Barry & Co.
No. 1010 line.....85&5%
No. 41 line.....45&10%
No. 61 line.....50&5%
No. 21 line.....75%

Sash, &c.

Clark's, No. 1, $10; No. 2, $8 ₩ gr. .33⅓%
Ferguson's.....33⅓%
Morris and Triumph, list Aug. 16, 1886. 60&2%
Victor.....60&10&2%
Walker's.....10%
Attwell Mfg. Co.....25&33⅓%
Reading.....60&10@60%&10&10%
Hammond's Window Springs.....40%
Common Sense, Jap'd, Cop'd and Tr'ed.....₩ gr $4.00
Common Sense, Nickel Plated ₩ gr $10.00
Universal.....30%
Kempshall's Gravity.....60%
Kempshall's Model.....60@60&10%
Corbin's Daisy, list Feb. 15, 1886.....70%
Payson's Perfect.....60@60&10%
Hugunin's Sash Balances.....25&5&2%
Hugunin's New Sash Locks.....25&5&2%
Stoddard "Practical".....10%
Ives' Patent.....60&10@60&10&5%
Lieseche's, Nos. 100 and 110, ₩ gr $8; 105, $10.00.....20&10%
Davis, Bronze, Barnes Mfg. Co.....50%
Champion Safety, list March 1, 1888 55@55&5%
Security.....70%
Buckeye.....₩ gro $4.50

Lumber Tools—See Tools, Lumber

Lustre—

Four-ounce Bottles....₩ doz, $1.75; ₩ gross.....$17.00

Machines.

Boring—

	Without Augers.	Upright.	Angular.	
Douglas	$5.50	$6.75		50%
Snell's, Rice's Pat.	5.50	6.75	40&10	&10%
Jennings	5.50	6.75	45&15	&10%
Other Machines	2.35	2.75		
Phillips' Patent with Augers	7.00	7.50		
Miller's Falls	7.50			35%

Fluting.

Knox, 4½-inch Rolls.....$2.25 each } 35%
Knox, 6-inch Rolls.....$3.00 each }
Eagle, 3½-inch Roll, $2.15.....35%
Eagle, 5½-inch Roll, $2.85.....35%
Crown, 4½ in., $3.50; 6 in., $4.00; 8 in., $6.50 each.....35%
Crown Jewel 6 in.....$3.50 each, 35%
American, 5 in., $3.00; 6 in., $3.40; 7 in., $4.50 each.....35%
Domestic Fluter.....each, $1.50
Geneva Hand Fluter, White Metal ₩ doz $12, 25%
Crown Hand Fluter, Nos. 1, $15.00; $12.50; 3, $10.00.....30%
Shepard Hand Fluter, No. 85 ₩ doz 15 00.....40%

Shepard Hand Fluter, No. 110 ₱ doz $11.00 ..... 40%
Shepard Hand Fluter, No. 95 ₱ doz $8.00 ..... 40%
Clark's Hand Fluter. ₱ doz $15.00 ..... 35%
Combined Fluter and Sad Iron, ₱ doz $15.00 ..... 30%
Buffalo ₱ doz $10.00 ..... 10%

Hoisting—
Moore's Hand Hoist, with Lock Brake 20%
Moore's Differential Pulley Block 40%
Energy Mfg. Co's 25%
Sure Grip Steel Tackle Blocks 25%

Washing—
Anthony Wayne, ₱ doz No. 1, $51; No. 2, $45; No. 3, $42
Western Star, ₱ doz No. 2, $45; No. 3, $48.

Mallets.
Hickory ..... 20&10@20&10&10%
Lignumvitæ ..... 20&10@20&10&10%
B. & L. Block Co., Hickory & L. V. ..... 30@30&10%

Mattocks. Regular list, ... 60&10@60&10&5%

Measures—
Standard Fiberware, No. 1, peck, ₱ dozen, $4; ½-peck, $3.50.

Meat Cutters—See Cutters, Meat.

Menders, Harness—
Per doz. $2.00

Mills.
Coffee—
Box and Side, List Jan. 1, 1888 ..... 60&2%
American, Enterprise Mfg Co. ..... 20&10@30%
The Swift, Lane Bros. ..... 20&10%

Mincing Knives — See Knives, Mincing.

Molasses Gates—See Gates, Molasses.

Money Drawers — See Drawers, Money.

Mowers, Lawn.
Pennsylvania. New Model, Excelsior, Continental, &c ..... 60@60&5%
Philadelphia ..... 60&10%
Perfection ..... 60&10&10%
Easy ..... 60&10@60&10&5%
Other Machines ..... 60&10&5@70%

Muzzles—
Safety ..... ₱ doz, $3.00, 25%

Nails.

Cut and Wire. See Trade Report.
Wire Nails, Papered.
Association list, July 15, '89 ..... 75&10%
Tack Mfrs.' list 70%
Wire Nails, Standard Penny.
Card June 1, '89, base ..... $2.30 @ $2.35

Horse—

	Nos. 6	7	8	9	10
Ausable	.28¢	26¢	25¢	24¢	23¢.

40&5&2%

Clinton, Fin.	19¢	17¢	16¢	15¢	14¢ 30%
Essex	.28¢	26¢	25¢	24¢	23¢.

25&10@25&10&10%

Lyra	19¢	17¢	16¢	15¢	14¢ 30%
Snowden	19¢	17¢	16¢	15¢	14¢ 30%
Putnam	.23¢	21¢	20¢	19¢	18¢.

1000 ₱ in year 15%

Vulcan	.23¢	21¢	20¢	19¢	18¢.	12½&5%
Northwest'n.	25¢	23¢	22¢	21¢	20¢.	

25@25&5%

Globe	.23¢	21¢	20¢	19¢	18¢.	

20&5&5%

Boston	.23¢	21¢	20¢	19¢	18¢.	

20&5&5%

A. C.	.25¢	23¢	22¢	21¢	21¢.	

25&10@33½&5%

C. R.-K.	.25¢	23¢	22¢	21¢	21¢.	

25&10@33½&5%

Maud S.	.25¢	23¢	22¢	21¢	21¢.	

40&10%

Champlain	.28¢	6¢	25¢	24¢	23¢.	

25&10&10%

New Haven	.28	26¢	25¢	24¢	23¢.	

25&10@25&10&10%

Saranac	.23¢	21¢	20¢	19¢	18¢.	.30&10%
Champion	.25¢	23¢	22¢	21¢	20¢.	

10&10&10%

Capewell	.28¢	26¢	5¢	24¢	23¢.	

35&5@35&10%

Star	.23¢	21¢	20¢	19¢	18¢.	

10&10@10&12½%

Anchor	.23¢	21¢	20¢	19¢	18¢	.35%
Western	.23¢	21¢	20¢	19¢	18¢	.40&10%
Empire Bronzed						.14 ₱ ₱.

Picture—
Brass Head, Sargent's list ..... 50&10&10%
Brass Head, Combination list ..... 50&10%
Porcelain Head, Sargent's list. 50&10&10%
Porcelain Head, Combination list. 40&10%
Niles' Patent 40%

Nail Pullers.—See Pullers, Nail.

Nail Sets.—See Sets, Nail.

Nut Crackers.—See Crackers, Nut.

Nuts—List Dec. 18, 1889.

	Square.	Hex.
Hot Pressed	5.40¢	6.00¢ off list.
Cold Punched	5.00¢	5.10¢ off list.

In packages of 100 ₱, add 1-10¢ ₱ ₱. net; in packages less than 100 ₱, add ½¢ ₱ ₱, net.

Oakum—

Best or Government ..... ₱ ₱ 7@7½¢
U. S. Navy ..... ₱ ₱ 6@6½¢
Navy ..... ₱ ₱ 5½¢@6¢

Oilers—
Zinc and Tin ..... 65&10@70%
Brass and Copper ..... 50&10@50&10&5%
Malleable, Hammers' Improved, No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₱ doz. 10@10&5%
Malleable, Hammers, Old Pattern, same list 40%
Prior's Pat. or "Paragon" Zinc, 60&10&10%
Prior's Pat. or "Paragon" Brass 50%
Olmstead's Tin and Zinc 60%
Olmstead's Brass and Copper 50%
Broughton's Zinc 60%
Broughton's Brass 50%
Gem P. D. & Co. ..... ₱ gro. $2
Steel, Draper and Williams 50%

Openers, Can.
Messenger's Comet ..... ₱ doz $3.00, 25%
American ..... ₱ gross $3.00
Duplex ..... doz 25¢, 15@20%
Lyman's ..... ₱ doz $3.75, 20%
No. 4 French ..... ₱ doz $2.25, 55&60%
No. 5, Iron Handle ..... ₱ gr $6.00, 45&50%
Eureka ..... ₱ doz $2.50, 10%
Sardine Scissors ..... ₱ doz $2.75@3.0.
Star ..... ₱ doz $2.75
Sprague, No. 1, $2.00; 2, $2.25; 3, $2.50- 50&10&10%
Excelsior No. 1 $2.50; No. 2, $1.50 ..... 40%
World's Best, ₱ gross, No. 1, $12.00; No. 2, $24.00; No. 3, $36.00 ..... 50&10%
Universal, ₱ doz $3.00 ..... 55&5%
Domestic, ₱ doz $2.50 ..... 45%
Champion ₱ doz $2.00 ..... 50%

Packing, Steam—

Rubber—
Standard ..... 60&5@65%
Extra ..... 50@50&5%
N. Y. B. & P. Co., Standard 50%
N. Y. B. & P. Co., Empire 60%
N. Y. B. & P. Co., Salamander 25%
Jenkins' Standard. ₱ ₱ 80¢ ..... 25@25&5%

Miscellaneous—
American Packing ..... 10¢@11¢ ₱ ₱
Russia Packing ..... 14¢ ₱ ₱
Italian Packing ..... 13¢@14¢ ₱ ₱
Cotton Packing ..... 15¢@17¢ ₱ ₱
Jute ..... 7¢@8¢ ₱ ₱

Padlocks—See Locks.

Pails.
Galvanized Iron—

	Quarts	10	12	14
Hill's Light Weight, ₱ doz.	$2.75	3.00	3.25	
Hill's Heavy Weight, ₱ ds.	3.00	3.25	3.75	
Helwig's	2.50	2.75	3.00	
Sidney Shepard & Co.	2.35	2.85	3.05	
Iron Clad	2.50	2.75	3.00	
Fire Buckets	2.75	3.25	3.50	

Buckets, see Well Buckets.
*Indurated Fibre Ware—*25%
Star Pails, 12 qt ..... ₱ doz $5.40
Fire, Stable and Milk, 14 qt .. ₱ doz $7.80
Standard Fibre Ware—

	Plain.	Deer'd
Water Pails, 12 qt., per doz.	$4.00	$4.50
Dairy Pails, 14 qt., per doz.	4.50	5.00
Fire Pails, No. 1, 12 qt. per doz	4.50	
Fire Pails, No. 2, 14 qt. per doz	5.00	
Sugar Pails	6.00	6.50
Horse Pails	5.00	
Buggy Pails	4.00	
Slop Jars (bal. trap)	8.00	9.00
Chamber Pails, 14-qt	6.50	7.50

Pans.
Dripping.
Small sizes ..... ₱ ₱ 6¼¢
Large sizes ..... ₱ ₱ 5¾¢
Silver & Co. (Covered) 40%
Fry—
Standard List:

No.	0	1	2	3	4
₱ doz.	$3.00	$3.75	$4.25	$4.75	$5.25
No.	5	6	7	8	
₱ doz.	$6.00	$7.00	$8.00	$9.00	

Polished, regular goods ..... 70&10%
Acme Fry Pans ..... 60&10%
Dust—
Steel Edge, No. 1 ..... ₱ doz $1.75

Paper and Cloth—
Sand and Emery—
List April 19, 1886 ..... 50@50&10%
Sibley's Emery and Crocus Cloth 80%

Parers.
Apple.

Advance	₱ doz	$4.75
Baldwin	₱ doz	5.25
Bonanza	each	5.00
Champion	₱ doz	7.25
Daisy	each	4.00
Dandy	each	7.50
Eureka, 1888	each	16.00
Family Bay State	₱ doz	12.00
Favorite	₱ doz	5.00
Gem	₱ doz	5.25
Gold Medal	₱ doz	4.00
Ideal	₱ doz	4.00
Improved Bay State	₱ doz	27.00 @ 30.00
Little Star	₱ doz	4.50
Monarch	₱ doz	13.50
New Lightning	₱ doz	5.50
Oriole	₱ doz	4.00
Penn	₱ doz	4.00
Perfection	₱ doz	4.00
Pomona	₱ doz	4.00
Rocking Table	₱ doz	6.00
Turntable	₱ doz	4.50
Victor	₱ doz	13.50
Waverly	₱ doz	4.00
White Mountain	₱ doz	4.00
72	₱ doz	4.25
76	₱ doz	5.75
78	₱ doz	6.50

Potato—
White Mountain ..... ₱ doz $4.50
Antrim Combination ..... ₱ doz $5.50
Hoosier ..... ₱ doz $13.50
Saratoga ..... ₱ doz $5.50

Pencils—
Faber's Carpenters' ..... high list 50%
Faber's Round Gilt ..... ₱ gro $5.25
Dixon's Lead ..... ₱ gro $4.50
Dixon's Lumber ..... ₱ gro $6.75
Dixon's Carpenters' 10%

Picks—
Railroad or Adze Eye, 5 to 6, $12.00; 6 to 7, $13.00 ..... 60&10@60&10&5%

Picture Nails.—See Nails, Picture.

Pinking Irons.—See Irons, Pinking.

Pins.
Bow—
Humason, Beckley & Co.'s ..... 60&10%
Sargent & Co's ..... $17 and $18 ..... 60&10%
Peck, Stow & W Co ..... 50&10&50&10&5%
Curtain—
Silvered Glass ..... net
White Enamel ..... net
Escutcheon.
Iron, list Nov. 11, 1885 ..... 50&10@50&10&5%
Brass ..... 60@60&5%

Pipe, Wrought Iron—
List September 18, 1889.
1¼ and under, Plain 55%
1¼ and under, Galvanised 45%
1½ and over, Plain 65%
1½ and over, Galvanised 52½%
Boiler Tubes.
Sizes up to 2¾ in. inclusive 55%
Sizes 3 to 6 in. inclusive 65%
Sizes 7 in. and up 55%
Casing 55%

Planes and Plane Irons—
Wood Planes—
Molding ..... 35&2%
Bench, First Quality ..... 50&2%
Bench, Second Quality ..... 55&2%
Bailey's (Stanley R. & L. Co.). .. 40&10%
Iron Planes—
Bailey's (Stanley R. & L. Co.) ..... 40&10@40&10&10%
Miscellaneous Planes (Stanley R. & L. Co.) ..... 20&10@20&10&10%
Victor Planes (Stanley R. & L. Co.) ..... 20&10@20&10&10%
Steer's Iron Planes ..... 35@35&10%
Merrien Mal. Iron Co.'s ..... 40@40&10%
Davis's Iron Planes ..... 40@40&10%
Birmingham Plane Co. ..... 50@50&10%
Gage Tool Co.'s Self-Setting ..... 20&10&10%
Chaplin's Iron Planes ..... 40@40&10%
Sargent's ..... 30&10@30&10&10%
Standard Tool Co. ..... 50@50&5%
Plane Irons—
Butcher's ..... $5.00@$5.25 to £
Buck Bros 30%
Auburn "Thistle" } 35&2%
Ohio } 35&2%
Sandusky } 35&2%
S. & I. J. White 25%

Plates.
Fellce ..... ₱ ₱ 6¢@6¼¢

Pliers and Nippers—
Button's Patent ..... 50@50&10%
Hall's No. 2, 5 in., $13.50; No. 4, 7 in. $21.00 ₱ doz ..... 20&10@33⅓%
Humason & Beckley Mfg. Co. ..... 50@50&10%
Lindsay's Giant 40%
Gas Pliers 60%
Gas Pliers, Custar's Nickel Plated. 60&5%
Eureka Pliers and Nippers 40%
Russell's Parallel 25%
P. S. & W. Cast Steel 50%
P. S. & W. Tinners' Cutting Nippers, add 6% dis 10%
Carew's Pat. Wire Cutters 20%
Morrill's Parallel, ₱ dos, $12.00 ..... 30&5%
Cronk's 8 in., $15.00; 10 in. $21.00, 40@40&5%

Plumbs and Levels—
Regular List ..... 70&10@70&10&10%
Disston's 50%
Pocket Levels ..... 70&10@70&10&10%
Davis Iron Levels 30%
Davis' Inclinometers ..... 10&10%

Poachers.
Egg.
Buffalo Steam Egg Poachers, ₱ doz, No. 1, $6.00; No. 2, $9.00 ..... 35%
Silver & Co., 6-Ring. ₱ doz $4; 3-Ring $2

Pokes, Animal—
Bishop's L. X. L. ..... ₱ doz $6.00
Bishop's O. K. ..... ₱ doz $5.25
Bishop's Pioneer ..... ₱ doz $3.75
Bishop's American ..... ₱ doz $2.75
Eagle, Double Stale ..... ₱ doz $5.75
Eagle, Single Stale ..... ₱ doz $3.75
Buckeye, Single Stale ..... ₱ doz $2.75

Police Goods.
R. I. Tool Co., Handcuffs, $15.00 ₱ doz 10%
R. I. Tool Co., Leg Irons, $25.00 ₱ doz 10%
Tower's 25%
Daley's Improved Handcuffs: 2 Hands, Polished, ₱ doz $48.00; Nickeled, $57.00; 3 Hands, Polished, ₱ doz $72.00; Nickeled, $84.00 ..... 25%
J. P. Lovell's Police Goods 25%

Polish, Metal.
Prestoline 50%
Prestoline Paste 33⅓%
Gaston's Silver Compound 33⅓%

Polish. Stove.
Joseph Dixon's ..... ₱ gro $6.00, 10%
Gem ..... ₱ gro $4.50, 10%
Gold Medal ..... ₱ gro $6.00, 25%
Mirror ..... ₱ pro $6.00, —%
Lustro ..... ₱ gro $4.75
Ruby ..... ₱ gro $3.75
Rising Sun, 5 gro lots ..... ₱ gro $5.50
Dixon's Plumbago ..... ₱ ₱ 8¢
Boynton's Noon Day, ₱ gro 13.00
Parlor Pride Stove Enamel. ₱ gro
Yates' Liquid, 2 3 5 10 gal. ...
₱ gal ... $0.80 .70 .60 .50
Yates Standard Paste Polish, 10-₱ cans, ₱ ₱ 12½¢
Jet Black ..... ₱ gro $3.50
Japanese ..... ₱ gro $2.50
Fireside ..... ₱ gro $2.50
Diamond O. K. Enamel ..... ₱ gro $19.00
Bonnell's Liquid Stove Polish. ₱ gro $9.00
Bonnell's Paste Stove Polish. ₱ gro $6.00
Black Eagle Benzine Paste, 5 and 10 ₱ cans ..... 12½¢
Black Jack Water Paste, 5 and 10 ₱ cans ..... 12½¢
Nickel Plate Paste ..... ₱ gro $6.00
Crown Paste ..... ₱ gross, $7.20
Crown Paste, in 5 and 10 ₱ pails ₱ ₱ 12¢
Black Flag ..... ₱ gross, $7.20
Black Flag, 5 and 10 ₱ pails, ... ₱ ₱, 12¢
Black Flag, liquid, in bottles, ₱ gro. $8.00

Poppers, Corn—
Round or Square, 1 qt. ₱ gr $10.00@10.50
Round or Square, 1½ qt. ₱ gr $15@15.50
Round or Square, 2 qt. ₱ gr $18.50@19.00

Post Hole and Tree Augers and Diggers—See Diggers, Post Hole, &c.

Potato Parers—See Parers, Potato.

Pots.
Glue—
Tinned 40%
Enameled ..... 40&5%
Family, Howe's "Eureka" 40%
Family, L. F. C.'s "Handy" 50%

Presses.
Fruit and Jelly—
Enterprise Mfg. Co. ..... 20&10@30%
Henis ..... ₱ doz $3.50
Shepard's Queen City 40%
Silver & Co. ..... ₱ doz $2.75

Pruning Hooks and Shears.—See Shears.

Pullers.
Nail.
Scranton ..... ₱ doz $18.00, 33⅓%
Curtiss Hammer ..... ₱ doz $9.00
Giant, No. 1 ..... ₱ doz. $13.00, 10%
Giant, No. 2 ..... ₱ doz, $15.00, 10%
Pelican ..... ₱ doz. $9.00, 25%
Eclipse ..... ₱ doz, $18.00, 30%

Pulleys—
Hot House, Awning, &c. ..... 60&10%
Japanned Screw ..... 60&10%
Brass Screw ..... 60&10%
Japanned Side ..... 60&5&10%
Japanned Clothes Line ..... 60&10%
Empire Sash Pulley ..... 55@60%
Moore's Sash, Anti-Friction 50%
Hay Fork, Solid Eye, $4.00; Swivel, $4.50 ..... 50&10@50&10&5%
Hay Fork, "Anti-Friction," 5 in. Solid, $5.70 ..... 50%
Hay Fork, "₱" Common and Pat. Bushed 20%
Hay Fork, Tarbox Pat. Iron 20%
Hay Fork, Reed's Self-Lubricating ... 60%
Shade Rack 45%
Tackle Blocks ..... See Blocks
Moore's Anti-Friction 5 in. Wheel, ₱ doz $12.00 ..... 40%

Pumps—
Cistern, Best Makers ..... 60@60&10%
Pitcher Spout, Best Makers ..... 67½@70%
Pitcher Spout, Cheaper Goods. 70@70&5%

Punches—
Saddlers' or Drive, good, ₱ doz ... 60@65¢
Bemis & Call Co.'s Cast Steel Drive. .50&5%
Bemis & Call Co's Springfield Socket. 50&5%
Spring, good quality ..... ₱ doz $2.50@2.60
Spring, Leach's Pat. 15%
Bemis & Call Co.'s Spring and Check .40%
Solid Tinners', P. S. & W. Co., ₱ doz $1.44, 55%
Tin'rs' Hollow Punches P. S. & W. Co. 20&2%
Rice Hand punches 15%
Avery's Revolving 40%
Avery's Saw-Set and Punch. See Saw Sets.

Rail—

Sliding Door, Wr't Brass, ₱ ₱ 35¢ 15%
Sliding Door, Bronzed Wr't Iron. ₱ ft. 7¢
Sliding Door, Iron, Painted, ₱ foot 4¢, 40%
Barn Door, Light, In. ½ ¾ 1
Per 100 feet $2.00 2.50 3.10, 10%
B. D. for N. E. Hangers—

	Small.	Med.	Large.
Per 100 feet	$2.15	2.70	3.35..net

Terry's Steel Rail, ₱ foot ..... 4½¢
Victor Track Rail, 7¢ ₱ foot ..... 50&2%
Carrier Steel Rail, ₱ foot ..... 4½¢
Moore's Wrought Iron 25%

Rakes—
Cast Steel, Association goods ..... 60%@70%
Cast Steel, outside goods 60&10&10@70&5%
Malleable ..... 70@70&5%
Gibbs Lawn Rake ..... $12.00, 50&15
Canton Lawn Rake ..... $9.00, 50&10
Ft. Madison Prize Bow Brace and Peerless 55%
Fort Madison Steel Tooth Lawn Rake, $6.00 ..... 25%

Razors—
J. R. Torrey Razor Co 30%
Wostenholme and Butcher, $10.00 to £, 10%
Jordan's AAAI, new list ..... net
Jordan's Old Faithful, new list ..... net
Galvanic ..... ₱ doz $15.00

Razor Strops—See Strops, Razor.

Rings and Ringers.
Bull Rings—
Union Nut Co. 55%
Sargent's ..... 66%&10@70&5%
Hotchkiss' low list 30%
Humason, Beckley & Co.'s ..... 70&10%
Peck, Stow & W. Co's. .50&10&50&10&10%
Ellrich Hdw. Co., White Metal, low list. 50@50&10%
Hog—
Top of the Hill Ringers ..... ₱ doz $2.00
Top of the Hill Rings ..... ₱ doz $1.25
Hill's Improved Ringers ..... ₱ doz $1.25
Hill's Old Style Ringers ..... ₱ doz $1.12½
Hill's Tongs ..... ₱ doz $3.00
Hill's Rings ..... ₱ doz $1.00
Perfect Rings ..... ₱ doz bxs $1.50
Perfect Ringers ..... ₱ doz $2.15@$2.25
Blair's Hog Ringers ..... ₱ doz $2.00
Blair's Hog Rings ..... ₱ doz 90¢@$1.00
Champion Ringers ..... ₱ doz $2.00
Champion Rings, Double ..... ₱ doz $2.25
Brown's Ringers ..... ₱ doz $2.00
Brown's Rings ..... ₱ doz $1.15&1.25
Electric Hog Rings ... ₱ doz boxes $1.50
Electric Hog Ringers ..... ₱ doz $2.00

Rivets and Burrs—
Iron, list Nov. 17, '87 ..... 40%
Copper ..... 60@60&10%
Copper-ed Iron, Bettina Brand 40%

Rivet Sets—See Sets.

Rods—
Stair, Brass ..... 25&2%
Stair, Black Walnut ..... ₱ doz 40¢

Rollers—
Barn Door, Sargent's list ..... 60&10&10%
Acme Moore's Anti-Friction 55%
Union Barn Door Roller 70%

Rope.
Manila ... ¾ in. and larger ..... ₱ ₱ 10½¢
Manila ..... ¾ in. ₱ ₱ 10¾¢
Manila ..... ¼ and 5-16 in. ₱ ₱ 11¼¢
Manila Tarred Rope ..... ₱ ₱ 9¾¢
Manila, Hay Rope ..... ₱ ₱ 10¾¢
Sisal ..... ½ inch and larger ₱ ₱ 7¼¢
Sisal ..... ¾ in. ₱ ₱ 7¾¢
Sisal ..... ¼ and 5-16 in. ₱ ₱ 8¼¢
Sisal, Hay Rope ..... ₱ ₱ 7¾¢
Sisal, Tarred Rope ..... ₱ ₱ 6¾¢
Sisal, Medium Lathe Yarn ..... ₱ ₱ 6 ¢
New Zealand ..½ in. and larger ₱ ₱ 7 ¢
New Zealand ..... ⅝ inch, ₱ ₱ 7½¢
New Zealand, ¼ and 5-16 inch, ₱ ₱ 8 ¢
New Zealand, Hay Rope ..... ₱ ₱ 7 ¢
New Zealand, Tarred Rope ..... ₱ ₱ 6¼¢
Note.—Manufacturers' prices on above ⅛¢ ₱ ₱ less, f. o. b. factory.
Cotton Rope ..... ₱ ₱ 13½@16¢
Jute Rope ..... ₱ ₱ 6¾@8¼¢
Wire
List May 1, 1886.
Iron ..... 32½&2½%
Iron, Galvanized ..... 40&2½%
Cast Steel ..... 40&2½%

Rules—
Boxwood ..... 80&10&10@80&10&10&10%
Ivory ..... 50@50&10%
Starrett's Rules and Straight Edges, Steel ..... 25&10%

Sad Irons—See Irons, Sad.

Sand and Emery Paper and Cloth—See Paper and Cloth, Sand and Emery.

Sash Cord—See Cord, Sash.

Sash Locks—See Locks, Sash.

Sash Weights—See Weights, Sash.

Sausage Stuffers or Fillers—See Stuffers or Fillers, Sausage.

Saws—
Disston's Circular 45%
Disston's Cross Cuts 45%
Disston's Hand 20%
Woodrough & McParlin.
Hand, Panel and Rip 25%
Narrow Champion Cross Cuts with Handles, ₱ foot ..... 20¢
Champion Thin Back Cross Cuts, ₱ foot ..... 28¢
Champion Extra Thin Back Cross Cuts, ₱ foot ..... 31¢
One Man Champion Cross Cuts, ₱ foot ..... 40¢
Wheeler, Madden & Clemson Mfg. Co.
Hand, Panel and Rip 30%
Narrow Champion Cross Cuts with Handles, ₱ foot ..... 20¢
Champion Thin Back Cross Cuts, ₱ foot ..... 28¢
Champion Extra Thin Back Cross Cuts, ₱ foot ..... 31¢
One Man Champion Cross Cuts, ₱ .40¢

Atkins' Circular Shingle and Heading ..dis 50%
Atkins' Silver Steel Diamond X Cuts ..₩ foot 70¢
Atkins' Special Steel Dexter X Cuts ..₩ foot 50¢
Atkins' Special Steel Diamond X Cuts ..₩ foot 32¢
Atkins' Champion and Electric Tooth X Cuts..₩ foot 30¢
Atkins' Hollow Back X Cuts..₩ foot 20¢
Atkins' Mulay, Mill and Drag.....40%
Atkins' One-Man Saw, with handles, ₩ foot 40¢
Peace Circular and Mill.....45%
Peace Hand Panel and Rip.....25%
Peace Cross Cuts.....45%
Richardson's Circular and Mill.....45%
Richardson's X Cuts.....45%
Richardson's Hand, &c.....25%
C. E. Jennings & Co., Hand, Panel and Rip.....25%

Hack Saws—

Griffin's, complete.....40&10@50%
Griffin's Hack Saw, Blades....40&10@50%
Star Hack Saws and Blades.....25%
Eureka and Crescent.....25%

Scroll—

Lester, complete, $10.00.....25%
Rogers, complete, $4.00.....25%
Barnes' Builders' and Cabinet Makers', $15.....25%
Barnes' Scroll Saw Blades.....35%

Saw Frames—See Frames, Saw.

Saw Sets—See Sets, Saw.

Saw Tools—See Tools, Saw.

Scales—

Hatch, Counter, No. 171, good quality, ₩ doz $21.00
Hatch, Tea, No. 161....₩ doz $6.75@7.00
Union Platform, Plain.....$2.10@2.20
Union Platform, Striped.....$2.40@2.50
Chatillon's Grocers' Trip Scales.....50¢
Chatillon's Eureka.....25¢
Chatillon's Favorite.....40¢
Family, Turnbulls.....30@30&10%
Richie Bros.' Platform.....40%

Scale Beams—See Beams, Scale.

Scissors, Fluting.....45%

Scrapers—

Adjustable Box Scraper (S. R. & L. Co.) $8.50.....30&10%
Box, 1 Handle.....₩ doz $4.00, 10%
Box, 2 Handle.....₩ doz $6.00, 10%
Defiance Box and Ship.....20&10%
Foot.....50&10@60%
Ship, Common.....₩ doz $3.50 net
Ship, R. I. Tool Co.....10%

Screen Window and Door Frames—See Frames.

Screw Drivers—See Drivers, Screw.

Screws.

Bench and Hand—

Bench, Iron.....55&10@55&10&10%
Bench, Wood, Beech.....₩ doz $2.25
Bench, Wood, Hickory.....20&10%
Hand, Wood.....25&10@25&10&10%
Lag, Blunt Point, list Jan. 1, 1890.75&10%
Coach and Lag, Gimlet Point, list Jan. 1, 1890.....75@75&10%
Bed.....25&5%
Hand Rail, Sargent's.....60@60&10%
Hand Rail, H. & T. Mfg. Co...70&10@75%
Hand Rail, Am. Screw Co.....75%
Jack Screws, Millers Falls list..50@50&5%
Jack Screws, P. S. & W.....35%
Jack Screws, Sargent...60&10@60&10&5%
Jack Screws Stearns'.....40@40&10%

Cork—

Humason & Beckley Mfg. Co..40&10@50%
Williamson's.....33⅓@33⅓&5%
Howe Bros & Hulbert.....35%

Machine—

Flat Head, Iron.....55%
Round Head, Iron.....50%

Wood—

List January 1, 1891.
Flat Head Iron.....72½% @ Extra 10 & 10&5 % of ten given.
Round Head Iron.....67½%
Flat Head Brass.....72½%
Round Head Brass.....65 %
Flat Head Bronze.....72½%
Round Head Bronze.....65 %
Rovers' Drive Screws.....83⅓%

Scroll Saws—See Saws, Scroll.

Scythes.

Grain.....40&5@40&10%
Grass.....40&10@50%

Scythe Snaths—See Snaths, Scythe

Sets.

Awl and Tool.

Aiken's Sets, Awls and Tools, No. 20, ₩ doz $10.00.....55&10%
Fray's Adj. Tool Hdls., Nos. 1, $12; 2, $18; 3, $12; 4, $9.....35@35&10%
Miller's Falls Adj. Tool Hdls., Nos. 1, $12, 2, $18.....25%
Henry's Combination Haft...₩ doz $6.50
Brad Sets, No. 43, $10.50; No. 43, $12.50..70&10&5%
Stanley's Excelsior: No. 1, $7.50; No. 2, $4.00; No. 3, $6.50.....50&10%

Nail—

Square.....₩ gr., $4 00@$4.25
Round.....₩ gr. $3.25
Buck Bros.....27½%
Cannon's Diamond Point...₩ gr., $12, 20%

Rivet,

Regular list.....50&10%

Saw—

Stillman's Genuine...₩ doz $5.00@7.75, 40&5%
Stillman's Imita.....₩ doz $3.25@5.25, 40&5@40&10%
Common Lever.....₩ doz $2.00, 40&5%
Morrill's No. 1, $15.00; Nos. 2&3, $24.00, 40&10@50%
Leach's, No. 0, $9 00; No. 1, $15, 15@20% cash.....30&10@30&10&10

Hammer, Hotchkiss.....$6.50, 10%
Hammer, Bemis & Call Co.'s new Pat. .....30&5%
Bemis & Call Co.'s Lever and Spring Hammer.....30&5%
Bemis & Call Co.'s Plate.....10%
Bemis & Call Co.'s Cross Cut.....12½%
Aiken's Genuine.....$13.00, 50&10%
Aiken's Imitation.....$7.00, 55&5%
Hart's Pat. Lever.....20%
Disston's Star.....25%
Leopold.....40&10@50%
Atkin's Lever.....₩ doz No. 1, $6.00
Atkin's Criterion.....₩ doz No. 1, $6.00
Croissant (Keller), No. 1, $15.00; No. 2, $24.00.....40&10%
Avery's Saw Set and Punch.....50%
Chieftain H. R. Co.'s Superior.....₩ doz $15, 50%

Sharpeners, Knife.

Parkins.
Applewood Handles...₩ doz $6.00, 40%
Rosewood or Cocobolo.₩ doz $9.00, 40%

Shaves, Spoke.

Iron.....45%
Wood.....30%
Bailey's (Stanley R. & L. Co.).....40&10%
Stearns'.....30&10%
Cincinnati.....25&10%
Goodell's, ₩ doz $9.00.....25%

Shears—

American (Cast) Iron...75&10@75&10&5%
Barnard's Lamp Trimmers...₩ doz $3.75
Tinners'.....20&2%
Seymour's, List, Dec., 1881, 60&10&10@60&10&10&5%
Heinisch's, List, Dec., 1881, 60&10&10@60&10&10&5%
Heinisch's Tailor's Shears.....33⅓%
First quality C. S. Trimmers..80@80&10%
Second quality C. S. Trimmers, 80&10@80&10&10%
Acme Cast Shears.....10&10%
Diamond Cast Shears.....10%
Clipper.....10&10%
Victor Cast Shears.....75&10@75&10&5%
Howe Bros. & Hulbert, Solid Forged Steel.....40%
Chicago Drop Forge & F. Co., Solid Steel Forged.....60%
Clauss Shear Co., Japanned.....70%
Clauss Shear Co., Nickeled, same list.60%
Galvanic, 3½ to 9 in, ₩ doz, $1.00 ₩ inch

Pruning Shears and Hooks.

Disston's Combined Pruning Hook and Saw.....₩ doz $18.00, 20&10%
Disston's Pruning Hook, ₩ doz $12.00, 20&10%
E. S. Lee & Co.'s Pruning Tools.....40%
Pruning Shears, Henry's Pat, ₩ doz $3.75@4.00
Henry's Pruning Shears, ₩ doz $4.25@4.50
Wheeler, M. & C. Co.'s Combination, ₩ doz $12.00, 20%
Dunlap's Saw and Chisel, ₩ doz $8.50, 30%
J. Mallinson & Co., No. 1, $5.25; No. 2 7.25
P., S. & W. Co.....60%

Tinners', &c.—

Shears and Snips (P. S. & W.).....20@25%
Snips, J. Mallinson & Co.....33⅓%

Sheaves—

Sliding Door—

M. W. Co., list July, 1888..50&10@60&5%
R. & E., list Dec. 15, 1885.....55&20%
Corbin's list.....60&10&2%
Patent Roller.....60&10&2%
Patent Roller, Hatfield's.....75%
Russell's Anti-Friction, list Dec. 18, 1885.....60&2%
Moore's Anti-Friction.....50%

Sliding Shutter—

R. & E. list Dec. 18, 1885.....60&10&2%
Sargent's list.....60&10%
Reading list.....60&10&10%

Ship Tools—

L. & I. J. White.....20&5%

Shoes, Horse, Mule, &c.—

Horse—

Garden's, Perkins', Phœnix and Bryden's Boss at factory.....$4.00
Bryden's Frog Pressure, at factory.$5.00

Mule—

Add $1 ₩ keg to above prices.

Ox, Wrought—

Ton lots.....₩ ℔ 9¢
1000 ℔ lots.....₩ ℔ 9½¢
500 ℔ lots.....₩ ℔ 10¢

Shot—

	Ton lots	Small lots
Drop, up to BB, 25-℔ bag	$1.32	$1.37
Drop, up to BB, 5 ℔ bag	.35	.36
Drop, BB and larger, 25-℔ bag	1.57	1.62
Drop, BB and larger, 5-℔ bag	.40	.41
Buck and Chilled, 25-℔ bag	1.57	1.62
Buck and Chilled, 5-℔ bag	.40	.41
Dust Shot, 25-℔ bag	2.00	2.06
Dust Shot, 5-℔ bag	.45	.46

Shovels and Spades—

Ames' Shovels, Spades, &c., list Nov. 1, 1885.....20%
NOTE.—Jobbers frequently give 5&7½% extra on above.
Griffith's Black Iron.....50&10%
Griffith's C. S.....60@60&10%
Griffith's Solid C. S. R. R. Goods.....20%
St. Louis Shovel Co.....20@20&7½%
Hussey, Binns & Co.....15@25%
Hubbard & Co.....20@20&7½%
Lehigh Mfg. Co.....50&10%
H. M. Myers Co.....30 %
Payne Pettebone & Son.....35½&5%
Remington's (Lowman's Pat.)50&10@40%
Rowland's, Black Iron.....50&10%
Rowland's Steel.....60&5@60&10%

Shovels and Tongs—

Iron Head.....60&10@60&10&5%
Brass Head.....60&10&10%

Sieves—

Mann's Tin Rim.....50&25%
Buffalo Metallic, S. S. & Co.....50&25%
Shaker (Barler's Pat.) Flour Sifters.....₩ doz $2.00; ₩ gr $21.60
Electric.....₩ gr $21.00
A. & W. Sifters.....₩ doz 2.00
Hunter's.....₩ doz $2.00
Smith's Adjustable Sifters....₩ doz $2.00
Smith's Adjustable Milk Strainer. ₩ doz $2.00
Smith's Adjustable T. & C. Strainer. ₩ doz. $1.25

Sieves, Wooden Rim—

	Iron.	Plated.
Mesh 18, Nested, ₩ doz..	80¢	$1.00
Mesh 20, Nested, ₩ doz..	95¢	1.10
Mesh 24, Nested, ₩ doz..	$1.15	1.25

Skeins, Thimble—

Western list.....75&5@75&10%
Columbus Wrt. Steel. Special net prices
Coldbrookdale Iron Co.....60%
Seneca Falls Pattern.....60%
Utica P. S. T. Skeins.....60%
Utica Turned and Fitted.....35%

Slates—

School, by case.....50&10@50&10&10%

Snaps, Harness, &c.—

Anchor (T. & S. Mfg. Co.).....65%
Fitch's (Bristol).....50&10%
Hotchkiss.....10%
Andrews.....50%
Sargent's Patent Guarded....70&10&10%
German, new list.....40&10%
Covert.....50&2%
Covert, New Patent.....50&5&2%
Covert, New R. E.....60&2%
Covered Spring.....60&10&10%

Snaths, Scythe.

List.....50&10@50&10&5%

Soldering Irons—See Irons, Soldering.

Spittoons, Cuspidors, &c.

Standard Fiberware—

Cuspidors, 8½-inch, ₩ doz., No. 5, $8; No. 5X $9.
Spittoons, Daisy, 8-inch, No. 1, $4; 10 and 11 inch, $6.

Spoke Shaves—See Shaves, Spoke.

Spoke Trimmers—See Trimmers, Spoke.

Spoons and Forks—

Tinned Iron—

Basting, Cen. Stamp. Co.'s list....70&10%
Solid Table and Tea, Cen. Stamp. Co.'s list.....70&10%
Buffalo S. S. & Co.....33⅓&2%

Silver-Plated—(4 mos. or 5% cash 30 days).

Meriden Brit. Co., Rogers.....40&15%
C. Rogers & Bros.....40&15%
Rogers & Bro.....40&15%
Reed & Barton.....40@40&5%
Wm. Rogers Mfg. Co.....40, 15&5%
Simpson, Hall, Miller & Co.....40, 15&5%
Holmes & Edwards Silver Co...40, 15&5%
L. Boardman & Son.....50&12½%

Miscellaneous.

Holmes & Edwards Silver Co.:
No. 67 Mexican Silver.....50&10&5%
No. 30 Silver Metal.....50&10&5%
No. 24 German Silver.....50&10&5%
No. 50 Nickel Silver.....50&5%
No. 49 Nickel Silver.....50&10&5%
Wm. Rogers Mfg. Co.
Rogers' Silver Metal.....50, 10&5%
18% Rogers' German Silver.....60&5%
22% Rogers' Nickel Silver.....50&5%
German Silver.....50@50&5
German Silver, Hall & Elton..50&5% cash
Nickel Silver.....50&5@50&10&5% cash
Britannia.....60@60&5%
Boardman's N'ck'l Silver.....50&10&5%
Boardman's Britannia Spoons, case lots.....60&5% cash

Springs—

Door.—

Torrey's Rod, regular size....₩ doz $1.30
Gray's, ₩ gr., $20.00.....20%
Bee Rod ₩ gr., $20.00.....20%
Warner's No. 1, ₩ doz, $2.50; No. 2, $3.30.....40&10@50%
Gem (Coil), list April 19, 1886.....10%
Star (Coil), list April 19, 1886.....20%
Victor (Coil).....60@60&10%
Champion (Coil).....60&10@60&10&10%
Philadelphia, 5 in., $5.00; 8 in., $7.75..%
Cowell's....No. 1, ₩ doz, $18.00; No. 2, $15.00.....50%
Rubber, complete, ₩ doz, $4.50...55&10%
Hercules.....50%
Shaw Door Check and Spring.25@30@35%

Carriage, Wagon, &c.—

Elliptic, Concord, Platform and Halt Scroll.....60&10&10%
Cliff's Bolster Springs.....25%

Squares—

Steel and Iron.....} .80&10@80&10&10%
Nickel-Plated.....}
Try Square and T Bevels...60&10@60&10&10%
Disston's Try Square and T Bevels.....50%
Winterbottom's Try and Miter....30&10%
Starrett's Micrometer Caliper Squares.....25%
Avery's Flush Bevel Squares.....40%
Avery's Bevel Protractor.....50%

Squeezers.

Fodder.—

Blair's.....₩ doz $2.00
Blair's "Climax".....₩ doz $1.25

Lemon—

Porcelain Lined, No. 1....₩ doz $6.00, 25&30%
Wood, No. 2.....₩ doz $3.00, 35%
Wood, Common.....₩ doz $1.70@1.75
Dunlap's Improved.....₩ doz $3.75, 20%
Sammis....No. 1, $5.00; No. 2, $9; 12, $18 ₩ doz.....25&10%
Jennings' Star.....₩ doz $2.50
The Boss.....₩ doz $2.50
Dean's..Nos. 1, ₩ doz $6.50; 2, $5.35; 3, $1.90; Queen, $2.50
Little Giant.....50@50&5%
King.....40&5%
Hotchkiss Straight Flash....₩ doz $12.00
Silver & Co., Glass.....₩ gro. $9.00

Standard Fiber Ware—See Ware, Standard Fiber.

Staples.

Blind—

Barbed, ½ in. and larger.....₩ ℔ 7@7½¢
Barbed, ⅜ in.....₩ ℔ 8@8½¢

Fence Staples, Galvanized. } Same price as B'rb Wire.
Fence Staples, Plain..... } See Trd. Rep.

Steelyards.....40&10@50%

Stocks and Dies—

Blacksmith's
Waterford Goods.....40&10@50%
Butterfield's Goods.....40&10@40%
Lightning Screw Plate.....25@30%
Reece's New Screw Plates...33½&5@40%
Reversible Ratchet.....30 %
Gardner.....25%

Stops, Bench.

Morrill's.....₩ doz $9, 50%
Hotchkiss's.....₩ doz $5. 10@10&10%
Weston's, No. 1, $10; No. 2, $9.25&10&5%
McGill's.....₩ doz $3.....10%
Cincinnati.....25&10%

Stone—

Hindostan No. 1, 8¢; Axe, 3½¢; Slips No. 1, 4½¢
Sand Stone.....₩ ℔ 2½¢
Washita Stone, Extra.....₩ ℔ 20@21¢
Washita Stone, No. 1.....₩ ℔ 15@16¢
Washita Stone, No. 2.....₩ ℔ 11@12¢
Washita Slips, No. 1, Extra..₩ ℔ 37@40¢
Washita Slips, No. 1.....₩ ℔ 25@30¢
Arkansas Stone, No. 1, 4 to 6 in₩ ℔ $1.50
Arkansas Stone, No. 1, 6 to 9 in₩ ℔ $1.85
Turkey Oil Stone, 4 to 8 in.....₩ ℔ 40¢
Turkey Slips.....₩ ℔ $1.00@1.50
Lake Superior, Chase.....₩ ℔ 13¢
Lake Superior Slips, Chase.....₩ ℔ 20¢
Seneca Stone, Red Paper Brand...₩ ℔ 18@20¢
Seneca Stone, High Rounds..₩ ℔ 20@25¢
Seneca Stone, Small Whets..₩ gro $24.00

Stove Polish—See Polish, Stove.

Stretchers, Carpet.

Cast Steel, Polished.....₩ doz $2.25
Cast Iron, Steel Points.....₩ doz 80¢
Socket.....₩ doz $1.75
Bullard's.....25@25&10%

Strops, Razor—

Genuine Emerson.....60@60&5%
Imitation " ....₩ doz $2.00, 20&10&5%
Torrey's.....20%
Badger's Belt and Com.....₩ doz $2.00
Lamont Combination.....₩ doz $4.00
Jordan's Pat. Padded, list Nov. 1, '89.50%
Electric.....List net

Stuffers or Fillers, Sausage—

Miles' "Challenge," ₩ doz $20, 50@50&5%
Perry.....₩ doz, No. 1, $15.00; No. 0, $21.00.....50&5@50&10%
Draw Cut No. 4, each $30.00.....20%
Enterprise Mfg. Co.....20&10@30%
Silver's.....40&10%

Sweepers, Carpet.

Bissell No. 5.....₩ doz $17.00
Bissell No. 7 New Drop Pan.₩ doz $19.00
Bissell, Grand.....₩ doz $36.00
Grand Rapids.....₩ doz $24.00
Crown Jewel, No. 1, $18.00; No. 2, $19.00; No. 3, $20.00
Magic.....₩ doz $15.00
Jewel.....₩ doz $17.00
Improved Parlor Queen,
Nickeled.....₩ doz $27.00
Japanned.....₩ doz $24.00
Excelsior.....₩ doz $22.00
Garland.....₩ doz $18.00
Parlor Queen.....₩ doz $24.00
Housewife's Delight.....₩ doz $15.00
Queen.....₩ doz $16.00
Queen, with band.....₩ doz $18.00
King.....₩ doz $30.00
Weed, Improved.....₩ doz $18.00
Hub.....₩ doz $16.00
Cog-Wheel.....₩ doz $16.00
Easy.....₩ doz $22.00
Monarch.....₩ doz $22.00
Goshen.....₩ doz $21.00
Ladies' Friend.....₩ doz $15.00
Advance.....₩ doz $18.00
Supreme.....₩ doz $22.00

Tacks, Brads, &c.—

List Oct. 19, 1889. Standard Weights.

Carpet Tacks—
American Iron, Blued.....80%
Am. Iron, Tin'd or Cop'd...80&10%
Steel, Plain or Bright.....75&10%
Steel, Tinned or Coppered..80%
Swedes Iron, Blued.....75&10%
Swedes Iron, Tinned or Cop'd..80%
American Iron Cut Tacks.....80%
Swedes Ir. Uphol'rs' T'ks, Blu.75&10%
Swedes Iron Upholsterers' Tacks, Tinned.....80%
Gimp and Lace Tacks, Blued .75&10%
Gimp and Lace Tacks, Tin'd..75&10%
Swedes Iron Basket or Trimmers' Tacks.....75&10%
Miners' Tacks.....80%
Bill-Posters' or RR. Tacks...75&10%
Bill-Posters' or Railroad Tacks, Tinned.....80%
Copper Tacks.....40%
Copper Finish. & Trunk Nails....40%
Cigar Box Nails.....50%
Zinc Glaziers' Points.....40%
Picture-Frame Points.....50%
Looking-Glass Tacks.....50%
Brush Tacks.....55%
Tin-Capped Trunk Nails.....55%
Finishing Nails.....70&10%
Trunk and Clout Nails, Black and Tinned.....75%
Common and Patent Brads.....75%
Hungarian Nails.....75%
Basket and Chair Nails.....70&10%
Leathered Carpet Tacks.....55% Extra 5 @ 10%

Miscellaneous—

Double-Pointed, 120 count.....85&10%
Wire Carpet Nails.....60&10%
Plymouth Rock Steel Carpet Tacks..25%

Wire Brads & Nails, see Nails, Wire.
Steel-Wire Brads, R. & E. Mfg. Co.'s list.....60&10%

Tapes, Measuring—

American.....40@40&5%
Spring.....40%
Chesterman's, Regular list.....35@30%

Thermometers—

Tin Case.....80@80&10%

Thimble Skeins—See Skeins.

Ties, Bale- Steel

Standard Wire, list.....50&10&5%

Tinners' Shears, &c.—See Shears, Tinners', &c.

Tinware—

Stamped, Japanned and Pieced, list Jan. 20 1887.....70&10@70&10&5%

Tire Benders, Upsetters, &c— See Benders and Upsetters, Tire.

Tools.

Coopers'—

Bradley's.....20%
Barton's.....20@20&5%
L. & I. J. White.....20&5%
Albertson Mfg. Co.....35%
Beatty's.....30%
Sandusky Tool Co.....30@30&5%
Shaves, Cincinnati Tool Co.....30%

Lumber.

Ring Peavies, "Blue Line"...₩ dos $20.00
Ring Peavies, Common.....₩ dos $18.00
Steel Socket Peavies.....₩ dos $21.00
Mall, Iron Socket Peavies....₩ dos $19.00
Cant Hooks, "Blue Line"..₩ dos $16.00
Cant Hooks, Common Finish..₩ dos $14.00
Cant Hooks, Mall. Socket Clasp, "Blue Line" Finish.....$16.00
Cant Hooks, Mall. Socket Clasp, Common Finish.....₩ dos $14.50
Cant Hooks, Clip Clasp, "Blue Line" Finish.....₩ dos $14.00
Cant Hooks, Clip Clasp, Common Finish.....₩ dos $12.00
Hand Spikes....₩ dos 6 ft., $15.00; 8 ft., $20.00
Pike Poles, Pike & Hook, ₩ dos., 12 ft., $11.50; 14 ft., $12.50; 16 ft., $14.50; 18 ft., $17.50; 20 ft., $21.50.
Pike Poles, Pike only, ₩ dos, 12 ft., $10.00; 14 ft., $11.00; 16 ft., $13.00; 18 ft., $16.00; 20 ft., $20.00.
Pike Poles, not ironed, ₩ dos, 12 ft. $6.00; 14 ft., $7.00; 16 ft., $9.00; 18 ft., $12.00; 20 ft., $16.00.
Setting Poles, ₩ dos, 12 ft., $14.00; 14 ft., $15.00; 16 ft., $17.00
Swamp Hooks.....₩ dos $18.00

Saw.

Atkins' Perfection.....₩ dos $12.00
Atkins' Excelsior.....₩ dos $6.00
Atkins' Giant.....₩ dos $4.00

Tobacco Cutters—See Cutters, Tobacco.

Transom Lifters — See Lifters, Transom.

Traps—

Game—

Newhouse.....40@40&5%
Oneida Pattern.....70&10%
Game, Blake's Patent.....40&10&5%

Mouse and Rat—

Mouse Wood, Choker, ₩ dos holes, 11@13¢
Mouse, Round Wire.....₩ dos $1.50, 10%
Mouse, Cage, Wire.....₩ dos $2.50, 10%
Mouse, Catch-'em-alive....₩ ds $2.50 15%
Mouse, Bonanza.....₩ dos $9 90@$1.00
Rat, Decoy.....₩ gr $10.00, 10%
Ideal.....₩ gr $10.00
Cyclone.....₩ gr $5.25
Hotchkiss Metallic Mouse, 5-hole traps, ₩ dos., 90¢; in full cases, ₩ dos....75¢
Hotchkiss Imp. Rat Killer..₩ gro $18.50
Hotchkiss New Rat Killer...₩ gro $16.50
Schuyler's Rat Killer.....₩ gro $15.00

Triers—

Butter and cheese.....25%

Trimmers, Spoke.

Bonney's.....₩ dos $10.00, 50%
Stearns'.....30&10%
Ives', No. 1, $15.00; No. 2, $12.00 ₩ dos. 55&10%
Douglas'.....₩ dos $9.00, 20%
Cincinnati.....25%

Trowels—

Lothrop's Brick and Plastering. 20&10&5@35%
Reed's Brick and Plastering.....15%
Disston's Br'k and Plastering.....25%
Peace's Plastering.....25%
Clement & Maynard's.....20%
Rose's Brick.....15@20%
Brade's Brick.....25%
Worrall's Brick and Plastering.....20%
Garden.....70%

Trucks, Warehouse, &c.—

B. & L. Block Co.'s list, '82.....40%

Tubes, Boiler—

See Pipe.

Twine—

Flax Twine—	BC.	B.
No. 9, ¼ and ⅛ ℔ Balls	26¢	34¢
No. 12, ¼ and ⅛ ℔ Balls	26¢	32¢
No. 18, ¼ and ⅛ ℔ Balls	22¢	32¢
No. 24, ¼ and ⅛ ℔ Balls	22¢	32¢
No. 36, ¼ and ⅛ ℔ Balls	20¢	31¢
No. 264, Mattrass, ¼ and ⅛ ℔ Balls	52@54¢	
Chalk Line, Cotton, ⅛ ℔ Balls	25¢	
Mason Line, Linen, ⅛ ℔ Balls	55¢	
2-Ply Hemp, ¼ and ⅛ ℔ Balls (Spring Twine)	15½¢	
3-Ply Hemp, 1 ℔ Balls	16@16½¢	
3-Ply Hemp, 1½ ℔ Balls	15@15½¢	
Cotton Wrapping, 5 Balls to ℔	15@16¢	
2, 3, 4 and 5-Ply Jute, ⅛ ℔ Balls	10¢	
Wool	6½@36½¢	
Paper	13@14¢	
Cotton Mops, 6, 9, 12 and 15 ℔ to dos.	18¢	

Vises—

Solid Box.....50&10@50&10&5%

Parallel—

Fisher & Norris Double Screw.....15&10%
Stephens'.....25@30%
Parker's.....20@25%
Wilson's.....55%
Howard's.....40%
Bonney's.....40&10%
Millers Falls.....40@40&10%
Trenton.....40&5@40&10%
Merrill's.....15@20%
Sargent's.....60&10&10%
Backus and Union.....40%
Double Screw Leg.....15&10%
Prentiss.....20@25%
Simpson's Adjustable.....40%
Moore's.....20%
Massey Quick Action.....20 @ 25 %

Saw Filers—

Bonney's, Nos. 2 & 3, $15.00.....40&10%
Stearn's.....33⅓&10@33⅓&10&10%
Stearn's Silent Saw Vises.....33⅓@35%

Wagon Boxes—See Boxes, Wagon.

Washer Cutters—See Cutters Washer.

Wagon Jacks—See Jacks, Wagon.

Ware, Hollow, Enameled, &c.

Cast Iron, Hollow—

Stove Hollow-Ware—
Ground.....60&10%
Unground.....60&10&10%
White Enameled-Ware—
Maslin Kettles.....70%
Boilers and Saucepans.40&10@50&5%
Tinned Boilers and S'pans.40&10@50&5%
Rustless Hollow-Ware.....50@50&5%
Gray Enameled-Ware—
Stove.....50%
Maslin Kettles.....60&10&10%
Boilers and Saucepans.....40&5%

Enameled—

Agate and Granite Ware, list Jan. 1, 1889.....33⅓&10%
Ironclad Enameled Ware...dis 33⅓&10%

Kettles—

Galvanized Tea-Kettles—

Inch....	6	7	8	9
Each....	55¢	60¢		75¢

Standard Fiber—

	Per Dozen. Plain.	Dec'r'd
Wash-Basins, 10½ in.	$2.00	$2.25
Wash-Basins, 12 in.	2.25	2.75
Keelers, 11¼ in.		4.00
Cuspidors		8.00
Spittoons, "Daisy," 8 in.	4.00	4.50
Peck Measure	4.00	
Half-peck Measure	3.50	

See also Pails.

Indurated Fiber—25%

Spittoons, No. 2, ₩ doz.....$9.00
Basins, Ringed, ₩ dos., No. 3....$3.00
Washtubs, Nested, Nos. 0, 1, 2 and 3 (4 pieces), ₩ nest.....$7.50
Keelers, Nested, Nos. 1, 2, 3 and 4 (4 pieces), ₩ nest.....$3.70
Butter Bowls 15, 17 and 19-inch (3 pieces), ₩ nest.....$2.25
Liquid Measures, pt., qt., 2 qt. and funnell (4 pieces) ₩ set.....$3.00
See also *Pails*.

Silver Plated, Hollow—

4 mo. or 5 % cash in 30 days.

Reed & Barton.....
Meriden Britannia Co.....
Simpson, Hall, Miller & Co.....
Rogers & Brother.....
Hartford Silver Plate Co.....
William Rogers Mfg. Co.....
} 40&5%
} 40&5&5%

Washers—

Size hole	5-16	⅜	½	⅝ to 1⅜
Washers	6	5	3.50	3

In lots less than 200 ℔, ₩ ℔, add ¼¢, 5-2 boxes 1¢ to list.

Wedges—

Iron.....₩ ℔ 3½¢
Steel.....₩ ℔ 3½¢

Weights, Sash—

Solid Eyes.....₩ ton $18@$19

Well Buckets, Galvanized- See Buckets, Well, Galvanized.

Wheels, Well.

8 in., $2.25; 10 in., $2.70; 12 in., $3.38

Wire and Wire Goods—

Iron—

Market,
Br. & Ann., Nos. 0 to 18..... 77½%
Cop'd, Nos. 0 to 18..... 75%
Galv., Nos. 0 to 18..... 67½%
Tin'd, Tinned list Nos. 0 to 18.... 67½%
Stone,
Br. and Ann'd, Nos. 16 to 18....77½%
Bright and Ann'd, Nos. 19 to 26.... 80%
Br. and Ann'd, Nos. 27 to 36.....82½%
Tinned.....
Tinned Broom Wire, 18 to 21, ₩ ℔.... 5¢
Galvanized Fence, Nos. 8 and 9.....70%
Annealed Fence, Nos. 8 and 9.....80%
Annealed Grape, Nos 10 to 14.....80%
Brass, list Jan. 18, 1884.....35%
Copper, list Jan. 18, 1884.....35%
Barb Fence.....See Trade Report
Annealed Wire on Spools.....80%
Malin's Steel and Tin'd on Spools.....55%
Malin's Brass and Cop. on Spools.....45%
Tate's Spooled, Tinned and Annealed.55%
Tate's Spooled Cop. and Brass.....45%
Cast Steel Wire.....50%
Stubs' Steel Wire.....$6.00 to 2, 30%
Steel Music Wire, 12 to 30 .60@70¢ ₩ ℔
Wire Clothes Lines, see Lines.
Wire Picture Cord see cord.

Bright Wire Goods—

Standard list.....80&10%

Wire Cloth and Netting.

Painted Screen Cloth, good quality, ₩ 100 sq. ft., $1.40
Galvanized Wire Netting.....70&10@75%

Wire Rope—See Rope, Wire.

Wrenches—

American Adjustable.....40%
Baxter's Adjustable "S".....40&10@50%
Baxter's Diagonal.....40&10@50%
Coes' Genuine.....50&3%
Coes' "Mechanics'".....50&10&3%
Girard Standard.....65&10%
Lamson & Sessions' Engineers'..60&10%
Lamson & Sessions' Standard..70&10%
P. S. & W. Agricultural....
Girard Agricultural.....
Lamson & Sessions' Agric'l..
} 75& 5 @ 75 &10 %
Bemis & Call's
Pat. Combination.....35%
Merrick's Pattern.....35%
Brigg's Pattern.....20%
Cylinder or Gas Pipe.....40&5%
No. 3 Pipe.....40&10%
Aiken's Pocket (Bright).....$6.00, 50&10%
The Favorite Pocket.....₩ dos $4.00, 40%
Webster's Pat. Combination.....25%
Boardman's.....20&10%
Always Ready.....25&5%
Alligator.....50%
Donohue's Engineer.....20&10%
Acme, Bright.....50&3%
Acme, Nickeled.....40&3%
Hercules.....70%
Walker's.....55&3%
Diamond Steel.....55&3%
Cincinnati Brace Wrenches.....25&10%
Tafts' Vise Wrench.....55&10&3%

Wringers, Clothes—

List September 20, 1890, 2½ cash.

Wrought Goods—

Staples, Hooks, &c., list Jan. 12, 1888. 85@85&10

PAINTS, OILS AND COLORS.—Wholesale Prices.

Animal and Vegetable Oils.

Linseed, City, raw..per gal.	52	@	60
Linseed, City, boiled.....	55	@	63
Linseed, Western, raw.....	..	@	50
Lard, City, Extra Winter..	..	@	56
Lard, City, Prime.....	..	@	52
Lard, City, Extra No. 1....	45	@	47½
Lard, City, No. 1.....	40	@	42½
Lard, Western, prime.....	51	@	..
Cotton-seed, Crude, prime.	31	@	32
Cotton-seed, Crude, off grades.....	25	@	30
Cotton-seed, Summer Yellow, prime.....	..	@	38
Cottonseed, Summer Yellow, off grades.....	32	@	36
Sperm, Crude.....	72	@	73
Sperm, Natural Spring.....	..	@	..
Sperm, Bleached Spring....	..	@	..
Sperm, Natural Winter.....	73	@	75
Sperm, Bleached Winter...	78	@	80
Whale, Crude.....	..	@	..
Whale, Natural Winter.....	54	@	56
Whale, Bleached Winter...	56	@	58
Whale, Extra Bleached.....	58	@	60
Sea Elephant, Bleached Winter.....	63	@	64
Menhaden, Crude, Sound...	25	@	..
Menhaden, Crude, Southern	..	@	..
Menhaden, Light Pressed..	27	@	..
Menhaden, Bleached W'ter.	29	@	..
Menhaden, Extra Bleached	31	@	33
Tallow, City, prime.....	42	@	..
Tallow, Western, prime....	..	@	..
Cocoanut, Ceylon.....	6½	@	7¼
Cocoanut, Cochin.....	8¾	@	9
Cod, Domestic.....	40	@	43
Cod, Foreign.....	..	@	..
Red Elaine.....	36	@	38
Red Saponified.....₩ ℔	4¾	@	5
Bank.....per gal	27	@	..
Straits.....	28	@	..
Olive, Italian, bbls.....	65	@	70
Neatsfoot, prime.....	55	@	65
Palm, prime, Lagos....₩ ℔	6	@	6½

Mineral Oils.

Black, 29 gravity, 25 @ 30 cold test.....per gal	7¼	@	8
Black, 29 gravity, 15 cold test.....	8½	@	9
Black, 29 gravity, summer.	6½	@	7
Cylinder light, filtered.....	15	@	20
Cylinder, dark, filtered	12	@	15
Cylinder, dard, st'm refined	10	@	18
Paraffine, 23½ @ 24 gravity.	13½	@	14
Paraffine, 25 gravity.....	12½	@	13
Paraffine, 28 gravity.....	9½	@	10
Paraffine, red, 21 @ 22 gr'ty	..	@	..
Paraffine, red, 22½@23 gr'ty	13	@	14

Paints and Colors.

Barytes, Foreign, ₩ ton.	$23.00	@	24.00
Barytes, Amer. floated...	30.00	@	32.00
Barytes, Amer. No. 1....	19.00	@	20.00
Barytes, Amer. No. 2....	13.00	@	16.00
Barytes, Amer., No. 3....	11.00	@	12.00
Blue, Celestial.....₩ ℔	6	@	8
Blue, C hinese	50	@	55
Blue Prussian.....	25	@	40
Blue, Ultramarine	8	@	25
Brown, Spanish.....	½	@	1
Brown, Vandyke, Amer..	3	@	3½
Brown, Vandyke, English	6	@	8
Carmine, No. 40, in bulk.	3.10	@	..
Carmine, No. 40, in boxes or barrels	3.20	@	..
Carmine, No. 40, in ounce bottles.....	4.20	@	..
Chalk, in bulk.... ₩ ton.	2.75	@	3.00
Chalk, in bbls..₩ 100 ℔.	33	@	40
China Clay, English.... ₩ ton.	13.00	@	18.00
Cobalt Oxide, prep'd....	2.90	@	....
Cobalt Oxide, black... lots 100℔ 2.60		@	....
Cobalt, Oxide, black..... less 100℔ 2.65		@	....
Green, Paris, in bulk.....	14	@	15½
Green Paris, 170 @ 175 ℔ kegs.....	14½@		15¾
Green, Paris, small pack.	16	@	21½
Green, Chrome, ordinary	8	@	11
Green, Chrome, pure....	22	@	25
Lead, Eng., B.B. white....	8¾@		10
Lead, Amn. White, dry or in oil: Kegs, lots less than 1000 ℔..		@	7¼
Kegs, lots 1000 ℔ to 5 tons.		@	6¾
Kegs, lots 5 tons to 12 tons..		@	6¾
Kegs, lots 12 tons and over..		@	6½
Lead White in oil 25 ℔ tin pails add to keg price.		@	½
Lead, White, in oil, 12½ ℔ tin pails, add to keg price.....		@	1
Lead, White, in oil, 1 to 5 ℔ assorted tins, add to keg price.		@	2½
Lead, Red, bbls. and ½ bbls....	6¼	@	7
Lead, Red, kegs.....	6¾	@	7¼
Litharge, kegs.....	6½	@	7¼
Litharge, bbls and ½ bbls.....	6¼	@	7

TERMS, &c.—Lead and Litharge.—On lots of 1000 ℔ or over, 60 days' time or 2½ % discount for cash if paid within 15 days of date of invoice.

Ocher, Rochelle.....	1.35	@	1¾
Ocher, French Washed.....	1½	@	2½
Ocher, German Washed...	1½	@	3
Ocher, American.....	½	@	1½
Orange Mineral, English...	9	@	9½
Orange Mineral, French....	10	@	10½
Orange Mineral, German ..	9¼	@	10
Orange Mineral, American.	8	@	8¼
Paris White, English Cliffstone.....	1.00	@	1.15
Paris White, American.....	70	@	75
Red, Indian, English.....	5½	@	7
Red, Indian, American....	2	@	6¾
Red, Turkey.....	9	@	14
Red, Tuscan	9	@	11
Red, Venetian, American.. ₩ 100 ℔.	1.00	@	1.25
Red, Venetian, English...	1.00	@	1.50
Sienna, Italian, Burnt and Powd.₩ ℔	5	@	6¼
Sienna, Ital., Burnt Lumps	1½@		3½
Sienna, Ital., Raw, Powd..	5	@	6¾
Sienna, Ital., Raw Lumps..	2	@	3½
Sienna, American, Raw....	1½@		1¾
Sienna, American, Burnt and Powdered.....	1½@		1¾
Talc, French	1½@		1¾
Talc, American.....	1	@	1¼
Terra Alba, Fr'ch. ₩ 100 ℔	90	@	1.00
Terra Alba, English	50	@	60
Terra Alba, American No.1	70	@	75
Terra Alba, American No.2	40	@	50
Umber, Turkey, Bnt. and Powd.,..... ₩ ℔	3½@		4
Umber, Turkey Bnt.Ln	2¾@		3
Umber, Turkey, Raw and Powdered.....	3½@		
Umber Turkey, R'w Lmps	2½@		2¾
Umber, Turkey, Bnt. Amer.	1¼@		1¾
Umber, Turkey, R'w Amer.	1¼@		1¾
Yellow, Chrome.....	10	@	25
Vermilion Americ. Lead..	11½@		12
Vermilion, Quicks'er, bulk.	64	@	66
Vermilion, Quicks'er, bags.	65	@	67
Vermilion, Quicksilver, smaller pkgs.....	69	@	71
Vermilion English Import	80	@	85
Vermilion, Imitation, Eng.	8	@	35
Vermilion, Trieste...	87½@		90
Vermilion, Chinese.....	90	@	95
Whiting, Common, ₩ 100 ℔	40	@	45
Whiting, Gilders'.....	50	@	55
Zinc, American, dry....₩ ℔	4½@		5
Zinc, French, Red Seal....	..	@	8½
Zinc, French, Green Seal..	..	@	8¾
Zinc, French, V. M. X.....	..	@	7
Zinc, Antwerp, Red Seal...	..	@	7¼
Zinc, Antwerp, Green Seal	..	@	8½
Zinc, German, L. Z. O....	..	@	6¾
Zinc, V M. in Poppy Oil, G. Seal, lots of 1 ton and over.....	10¾@		11¼
lots less than 1 ton.....	11	@	11¾
Zinc, V. M. in Poppy Oil, Red Seal, ...	..	@	..
lots of 1 ton and over....	10	@	10¼
Lots of less than 1 ton....	10¼@		10¾

DISCOUNTS.—French Zinc.—Discounts to buyers of 10- bbl. lots of one or assorted grades, 1 %; 25 bbls, 2 %, 50 bbls, 4 %. No discount allowed on less than bbl. lots.

Colors in Oil.

Blue, Chinese.....₩ ℔	35	@	40
Blue, Prussian.....	20	@	45
Blue, Ultramarine.....	12	@	19
Brown, Vandyke.....	7	@	12
Green, Chrome.....	8	@	13
Green, Paris.....	16	@	18¼
Sienna, Raw.....	7	@	14
Sienna, Burnt.....	7	@	14
Umber Raw.....	7	@	10
Umber, Burnt	7	@	10

Putty.

In wooden pails.....	....	@	.01¾
In tin cans.....	.02	@	.02½
In bladders.....	.02	@	.02¼

Spirits Turpentine.

In regular bbls.....	39½@		..
In machine bbls.....	39½@		..

Glue.

Low Grade.....₩ ℔	8	@	10
Cabinet.....	12	@	14
Medium White.....	13	@	15
Extra White.....	17	@	20
French	10	@	22
English	10	@	15
Irish.....	12	@	.

CURRENT METAL PRICES.

JUNE 10, 1891.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market reports.

IRON AND STEEL.

Bar Iron from Store.

Common Iron:	
⅜ to 2 in. round and square.. 1 to 6 in. x ⅝ to 1 in.....	₩ lb 2.00 @ 2.10¢
Refined Iron:	
⅜ to 2 in. round and square.. 1 to 4 in. x ⅝ to 1¼ in..... 4½ to 6 in. x ⅝ to 1 in.....	₩ lb 2.10 @ 2.30¢
1 to 6 in. x ¼ and 5-16	₩ lb 2.30 @ 2.50¢
Rods—⅜ and 11-16 round and sq..	₩ lb 2.20 @ 2.40¢
Bands—1 to 6 x 3-16 to No. 12.....	₩ lb 2.40 @ 2.60¢
"Burden Best" Iron, base price..	₩ lb..... 3.00¢
Burden's "H. B. & S." Iron, base price.....	₩ lb..... 2.80¢
"Ulster".....	₩ lb..... 3.00¢
Norway Bars.....	4.00¢
Norway Shapes.....	5.00¢

Merchant Steel from Store.

	Per pound.
Open-Hearth and Bessemer Machinery, Toe Calk, Tire and Sleigh Shoe, base price in small lots.....	2¼¢
Best Cast Steel, base price in small lots	8 ¢
Best Cast Steel Machinery, base price in small lots.....	5¢

Sheet Iron from Store.

	Common American.		R. G.	Cleaned.
16 to 16.....	₩ lb 3.00	@ 3.00¢	3.35	@ .....¢
17 to 20.....	₩ lb 3.15	@ 3.25¢	3.35	@ 3.75 ¢
21 to 24.....	₩ lb 3.35	@ 3.35¢	3.60	@ .....¢
25 and 26....	₩ lb 3.35	@	3.60	@ .....¢
27.....	₩ lb 3.50	@ 3.62½¢	3.85	@ .....¢
28.....	₩ lb 3.65	@ .....¢	4.10	@ .....¢
	B. B.			2d qual.
Galv'd, 14 to 20,	₩ lb. 4.75	@ ...	4.60	@ .....¢
Galv'd, 21 to 24,	₩ lb, 5.12	@ ...	5.00	@ .....¢
Galv'd, 25 to 26,	₩ lb, 5.50	@ ...	5.35	@ .....¢
Galv'd, 27.....	₩ lb, 5 90	@ ...	5.70	@ .....¢
Galv'd, 28.....	₩ lb, 6.25	@ ...	6.10	@ .....¢
Patent Planished.....	₩ lb A 10¢			B, 9¢
Russia.....	₩ lb 10½¢ @ 11¢			
American Cold Rolled B. B.....	₩ lb 5¢ @ 7¢			
Craig Polished Sheet Steel.....	₩ lb, 8½¢			

English Steel from Store.

Best Cast.....	₩ lb 15 ¢
Extra Cast.....	₩ lb 16½ @ 17 ¢
Swaged, Cast.....	₩ lb 16 ¢
Best Double Shear.....	₩ lb 15 ¢
Blister, 1st quality.....	₩ lb 12 ¢
German Steel, Best.....	₩ lb 10 ¢
2d quality.....	₩ lb 9 ¢
3d quality.....	₩ lb 8 ¢
Sheet Cast Steel, 1st quality.....	₩ lb 15 ¢
2d quality.....	₩ lb 14 ¢
3d quality.....	₩ lb 12½¢
R. Mushet's "Special".....	₩ lb 48 ¢
" " "Titanic".....	₩ lb 20 ¢

METALS.

Tin.

	Per lb
Banca, Pigs.....	23¢
Straits, Pigs.....	22¢
Straits in Bars.....	24¢

Tin Plates.

			Per box.
	Charcoal Plates.—Bright.		
Melyn Grade.....	IC, 10 x 14..	@	$6.50
" "	IC, 12 x 12..	@	6.75
" "	IC, 14 x 20..	@	6.50
" "	IC, 20 x 28..	@	13 20
" "	IX, 10 x 14..	@	8.00
" "	IX, 12 x 12..	@	8 25
" "	IX, 14 x 20..	@	8 00
" "	IX, 20 x 28..	@	16 00
" "	DC, 12¼ x 17..	@	6.00
" "	DX, 12¼ x 17..	@	7.50
Calland Grade.....	IC, 10 x 14,.	@	6.50
" "	IC, 12 x 12..	@	6 75
" "	IC, 14 x 20..	@	6.40
" "	IX, 10 x 14..	@	7 65
" "	IX, 12 x 12..	@	8'00
" "	IX 14 x 20..	@	7.65
Allaway Grade.....	IC, 10 x 14..	@	6.15
" "	IC, 12 x 12..	@	6.30
" "	IC, 14 x 20..	@	6.15
" "	IC, 20 x 28..	@	12.00
" "	IX, 10 x 14..	@	7.30
" "	IX, 12 x 12..	@	7.60
	IX, 14 x 20..	@	7.30
	IX, 20 x 28..	@	14.50
" "	DC, 12¼ x 17..	@	5.80
" "	DX, 12¼ x 17.. 6.00	@	6.80
	Coke Plates.—Bright.		
Steel Coke.—IC, 10 x 14, 14 x 20,.		@	$5.70
10 x 20..		@	7.85
20 x 28..		@	11.20
IX, 10 x 14, 14 x 20..		@	6.60
BV Grade.—IC, 10 x 14, 14 x 20,.		@	5.70
	Charcoal Plates.—Terne.		
Dean Grade.—IC, 14 x 20..		@	$5.45
20 x 28..		@	10.60
IX, 14 x 20..		@	6.20
20 x 28..		@	12.35
Abecarne Grade.—IC, 14 x 20...		@	5.25
20 x 28...		@	10.60
IX, 14 x 20....		@	6.35
20 x 28..		@	12.35

Tin Boiler Plates.

IXX, 14 x 26.....112 sheets.....	@ $13.50
IXX, 14 x 28.....112 sheets....	@ 13.75
IXX, 14 x 31.....112 sheets	@ 15 25

Copper.

DUTY: Pig, Bar and Ingot, 1¼¢; Old Copper, 1¢ ₩ lb. Manufactured (including all articles of which Copper is a component of chief value), 35 % ad valorem.

Ingot.

Lake	@ 15 ¢
Anson'a Grade Arizona	@ 13½¢
Ansonia Grade Casting	@ 12½¢

Sheet and Bolt.

Prices adopted by the Association of Copper Manufacturers of the United States, December 5, 1890, being quotations for all sized lots.

Not wider than	Not longer than	And longer than	Weights per square foot and prices per pound. Over 64 oz.	32 to 64 oz.	16 to 32 oz.	14 to 16 oz.	12 to 14 oz.	10 to 12 oz.	8 to 10 oz.	Less than 8 oz.
30	72		22	22	22	23	24	25	28	30
30		72	22	22	22	23	25	27	31	....
36	96		22	22	22	24	26	30	33	....
36		96	22	22	23	25	27	31	35	....
48	96		22	22	24	26	28	32	....	....
48		96	22	22	25	27	29	33	....	....
60	96		22	22	27	29	34	....	....	....
60		96	22	23	28	....	....	....	....	....
84	96		23	24	....	....	....	....	....	....
84		96	24	25	....	....	....	....	....	....
Over 84 in. wide			25	27	....	....	....	....	....	....

All Bath Tub Sheets.....	16 oz.	14 oz.	12 oz.	10 oz.	
Per pound.....	$0.27	0.29	0.31	0.35	
Bolt Copper, ⅝ inch diameter and over, per pound.....					23¢

Circles, 60 inches in diameter and less, 3 cents per pound advance over lowest prices of Sheet Copper of the same thickness.

Copper Bottoms, Pits and Flats.

	Per pound.
14 ounce to square foot and heavier.....	26¢
12 ounce and up to 14 ounce to square foot.....	27¢
10 ounce and up to 12 ounce.....	29¢
Lighter than 10 ounce.....	32¢

Circles less than 8 inches diameter 2 cents per pound additional.

Circles over 13 inches diameter are not classed as Copper Bottoms.

Tinning.

Tinning sheets on one side, 10, 12 and 14 x 48 each.....	8¢
Tinning sheets on one side, 30 x 60 each.....	30¢
For tinning boiler sizes, 9 in. (sheets 14 in. x 60 in.), each.	15¢
For tinning boiler sizes, 8 in. (sheets 14 in. x 56 in.), each	12¢
For tinning boiler sizes, 7 in. (sheets 14 in. x 52 in.) each.....	12¢
Tinning sheets on one side, other sizes, per square foot.....	2½¢

For tinning both sides double the above prices.

Planished Brass and Copper.

14 x 48, 14 x 52, 14 x 56, 14 x 60 in.

14 and 16 oz. and heavier..33¢. By the case...32¢ ₩ lb
12 oz. and lighter.....35¢. By the case...34¢ ₩ lb

24 x 48 and 30 x 60.

14 and 16 oz. and heavier..36¢. 12 oz.....39¢ ₩ lb

Seamless Brass and Copper Tubes.

O. G.	N. G.	⅜	½	⅝	¾	⅞	1	1⅛
8-14	6-12	37	33	30	29	28	27	24
15	13	38	34	31	30	29	28	25
16	14	39	34	32	31	30	29	25
17	15	40	35	33	32	31	30	26
18	16	42	36	34	32	31	30	27
19	17	43	37	35	34	33	32	29
20	18-19	44	39	37	36	35	34	31
21	20	46	41	39	38	37	36	34
22	21	48	42	40	39	38	37	36
23	22	50	44	42	41	40	39	39
24	23	53	46	44	43	41	40	41
25	24	56	49	46	45	44	43	45

Copper Bronze and Gilding Tube, 3¢ ₩ lb additional.

Brazed Brass Tubing. (To No. 20, inclusive.

Above 5-16 inch to 3 inch, inclusive.....	35¢
Plain, above 3 inch.....	45¢
Plain, 5-16 inch.....	45¢
Plain, ¼ inch.....	60¢
Plain, 3-16 inch.....	$1.00
Plain, ⅛ inch.....	1.50
Fancy Tubing, Brass, to No. 20, inclusive.....	45¢ ₩ ft
Bronze Tubing, 3¢ ₩ lb more than Brass.	
Discount from list.....	25 @ .. %

Roll and Sheet Brass.

(Brown & Sharpe Standard Gauge.)

Common High Brass: Wider than and including	in. 2 10	in. 10 12	in. 12 14	in. 14 16	in. 16 18	in. 18 20	in. 20 22	in. 22 24
To No. 20, inclusive...	.21	.22	.23	.25	.27	.29	.31	.33
Nos. 21, 22, 23 and 24..	.22	.23	.24	.26	.28	.30	.32	.34
Nos. 25 and 26.....	.22½	.23½	.24½	.27	.29	.31	.33	.35
Nos. 27 and 28.....	.23	.24	.25	.28	.30	.32	.34	.36

Common High Brass: Wider than and including	in. 24 26	in. 26 28	in. 28 30	in. 30 32	in. 32 34	in. 34 36	in. 36 38	in. 38 40
To No. 20, inclusive...	.36	.39	.42	.46	.50	.55	.60	.65
Nos. 21, 22, 23 and 24..	.37	.40	.43	.47	.51	.56	.61	.68
Nos. 25 and 26.....	.38	.41	.44	.48	.52	.57	.63	.71
Nos. 27 and 28.....	.39	.42	.45	.49	.53	.58	.65	.75

Brass and Copper Wire.

Old English guage standard.	Com. high brass. Per lb.	Low brass. Per lb.	Gilding br'se & copper Per lb
All Nos. to No. 16, inclusive....	$0.22	$0 26	$0.30
No. 17 and No. 18.....	.23	.27	.31
No. 19 " " 20.....	.24	.28	.32
No. 21.....	.25	.29	.33
No. 22.....	.26	.30	.34
No. 23.....	.28	.32	.36
No. 24.....	.30	.34	.38
No. 25.....	.32	.36	.40
No. 26.....	.35	.39	.43
No. 27.....	.38	.42	.46
No. 28.....	.42	.46	.51
No. 29.....	.45	.49	.54
No. 30.....	.48	.52	.62
No. 31.....	.51	.55	.67
No. 32.....	.55	.59	.73
No. 33.....	.59	.63	.82
No. 34.....	.64	.68	.95
No. 35.....	.70	.74	1.30
No. 36.....	.76	.80	1.50
No. 37.....	1.00	1.04	1.70
No. 38.....	1.80	1.84	2.00
No. 39.....	2.00	2.00	3.20
No. 40.....	2.60	2.60	5.75

Spring Wire, 2¢ ₩ lb advance.

Copper Belt and Hose Rivets and Burrs.

	Per lb.		Per lb.
No. 5.....	49¢	No. 11.....	56¢
No. 6.....	49¢	No. 12.....	58¢
No. 7.....	49¢	No. 13.....	60¢
No. 8.....	50¢	No. 14.....	65¢
No. 9.....	52¢	No. 15.....	70¢
No. 10.....	54¢		

Tobin Bronze—Rods.

¼ inch and larger..... 18¢ ₩ lb, net

Tobin Bronze—Piston Rods.

1½ inch and smaller.....	20¢ ₩ lb, net
1¾ to 2¾ inch.....	22¢ ₩ lb, net
2¾ inch and larger.....	25¢ lb lb, net

Spelter.

Duty: Pig, Bars and Plates, $1.50 ₩ 100 lb.

Western Spelter	5½¢ @ 6 ¢
Bertha (pure)	8¼¢ @ 9 ¢

Zinc.

Duty; Sheet, 2½¢ ₩ lb.

600 lb casks.....	6¾¢
Per lb	7¼¢

Lead.

Duty: Pig, $2 ₩ 100 lb. Old Lead, 2¢ ₩ lb. Pipe and Sheets, 2½¢ ₩ lb.

American	4¾¢ @ 5¢
Bar.....	5 ¢ @ 5½¢
Pipe, subject to trade discount....	7¢
Tin-Lined Pipe, subject to trade discount....	15¢
Block Tin Pipes, subject to trade discount...	37½¢
Sheet, subject to trade discount.....	7¾¢

Solder.

½ @ ½ (Guaranteed)...	14¢
No. 1.....	12¢
Extra Wiping.....	11¾¢ @ 10¢

The prices of the many other qualities of Solder in the market indicated by private brands vary according to composition.

Antimony.

Cookson.....	₩ lb 16¢ @ 16½¢
Hallett's.	" .... @ 16 ¢

ALUMINUM.

Prices in Ingots.

In lots of 2000 lb and over..... ₩ lb $1.50

Old Metals.

(Prices Paid in New York.

Heavy Copper.....	₩ lb 12 ¢
Light Copper.....	₩ lb 11 ¢
Heavy Brass.....	₩ lb 10 ¢
Light Brass.....	₩ lb 8 ¢
Lead.....	₩ lb 4 ¢
Tea Lead.....	₩ lb 3½¢
Zinc.....	₩ lb 3 ¢
No. 1 Pewter.....	₩ lb 16 ¢
No. 2 Pewter.....	₩ lb 8 ¢
Wrought Scrap Iron.....	₩ gross ton $19.00
Heavy Cast Scrap.....	₩ gross ton 12.00
Stove Plate Scrap.....	₩ gross ton 8.00
Burnt Iron.....	₩ gross ton 6.00